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14. ABSTRACT

Suicide rates have been increasing in military personnel in the last several years (Lorge, 2008), and it is a vital goal that suicide screening and risk assessment techniques for members of the military be improved. The current project is an effort to accomplish this goal, by using a parsimonious yet fruitful research design to compare several highly promising risk assessment approaches to one another in the prediction of future suicide-related outcomes. The design has been implemented in a large military sample that has been documented to be at high risk for suicidal behavior, namely, army recruiters. Full access to the sample has been arranged. This project will deliver more efficient, economical, and effective suicide screening measures and risk assessment procedures that can be adapted to any area of the military.

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Table of Contents

Page

Introduction:

Suicide rates have been increasing in military personnel in the last several years (Lorge, 2008), and it is a vital goal that suicide screening and risk assessment techniques for members of the military be improved. The current project is an effort to accomplish this goal, by using a parsimonious yet fruitful research design to compare several highly promising risk assessment approaches to one another in the prediction of future suicide-related outcomes. The design has been implemented in a large military sample that has been documented to be at high risk for suicidal behavior, namely, army recruiters. Full access to the sample has been arranged. This project will deliver more efficient, economical, and effective suicide screening measures and risk assessment procedures that can be adapted to any area of the military.

Body:

As noted in previous reports, delays at the beginning of the project (mostly due to IRB delays) were an impediment, but we have overcome that problem and made significant progress toward getting back to the original plan. This allowed us to achieve all aims. We exceeded our stated goal of N = 5,000 baseline assessments; the last baseline assessment occurred in December 2013. Baseline data are valuable in themselves, as evidenced, for example, by our having already published multiple peer-reviewed journal articles on those data with even more in preperation. An important part of the project is also the follow-up component. With a follow-up interval of 18 months, the approved time extension allows follow-up on 4,000 of our baseline assessment participants. Power calculations suggest N=4,000 is adequate for all planned analyses.

Data Collection:

Current figures as of 09/29/14

Individuals who have been consented and offered participation in the study: 5705
Individuals who have completed the Stress and Mental Strain Survey (SAMSS): 3407
Individuals who have completed the Alternate Survey: 491
Individuals who have opted not to participate: 1807
Individuals who were removed from the study as of August 2014: 15

No one has voluntarily withdrawn from the study thus far, let alone the last approved period. However, 2 individuals were withdrawn from the study due to significant past TBI's. In addition over the last two years, we have had two separate incidents where the students were unable to complete both portion of the Stress and Mental Strain Survey (SAMSS) and the following IAT. On both occasions, the students were able to complete the SAMSS, but were unable to complete the following the IAT portion. These 15 students were dropped from the study by the principal investigator due to their inability to complete both portions of the SAMSS and the IAT.

The first incident occurred on 29JAN2013 due to the use of a “short address”, or issue with the URL link that linked the SAMSS to the IAT. Due to recent DoD policy changes, the use of “Short addresses” are no longer permitted and thus was consequently blocked by the Army’s Cyber Command, negating the attempts of 10 Soldiers in the Station Commanders class (participants 3081-3092) to complete the IAT. After discussing the matter w/ the PI (LTC Lim), the subjects were dropped from the study as they were unable to complete both portions of the assessment. The issues with the link were quickly remedied by USAREC IT staff and data collection continued the following day.

The second incident on 03SEP2013 at approximately 1500 occurred due to code in the IAT program which was forbidding participants to enter a participation ID that exceed “5000”. Hence approximately half (5) of the Soldiers in the Station Commanders class (participants 5019-5027) were unable to complete the IAT. After discussing the matter w/ the PI (LTC Lim), the subjects were dropped from the study as they were

unable to complete both the SAMSS and the IAT. The issues with the code were quickly remedied by Harvard IT staff and data collection continued later that week.
Other than these minor issues, there are no other significant issues to report or recommended individuals to withdraw from the study.

Proposed number of subjects to be recruited in the coming year: We have completed data collection at this point. We exceed our stated goal of N= 5,000 and the last baseline assessment occurred in December 2013. Power calculations suggest N=4,000 is adequate with that collection occurring in mid-2013 with the 18-month follow occurring in late 2014. The requested and approved time extension will provide time to evaluate the N=4000 baseline assessment and to complete the data analyses and report writing.

Research Projects

There have been multiple research manuscripts to come from this award. These manuscripts have been prepared even before the end of the proposed data collection period. Multiple manuscripts have been published or are currently in preparation. We are expecting many more publications from this wealth of important data. This will be especially true after all longitudinal data are collected. A detailed description of the current manuscripts are described below:

Our group published an article in Clinical Psychology Review.

1. Selby, E.A., Anestis, M.D., Bender, T.W., Ribeiro, J.D., Nock, M.K., Rudd, D.M., Bryan, C.J., Lim, I.C., Baker, M.T., Gutierrez, P.M., & Joiner, T.E. (2010). Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the Interpersonal-Psychological Theory of Suicide. *Clinical Psychology Review*. 30, 298-307.

Please see full copy of the above article in the appendices.

Abstract:
Suicide rates have been increasing in military personnel since the start of Operation Enduring Freedom and Operation Iraqi Freedom, and it is vital that efforts be made to advance suicide risk assessment techniques and treatment for members of military who may be experiencing suicidal symptoms. One potential way to advance the understanding of suicide in the military is through the use of the Interpersonal-Psychological Theory of Suicide. This theory proposes that three necessary factors are needed to complete suicide: feelings that one does not belong with other people, feelings that one is a burden on others or society, and an acquired capability to overcome the fear and pain associated with suicide. This review analyzes the various ways that military service may influence suicidal behavior and integrates these findings into an overall framework with relevant practical implications. Findings suggest that although there are many important factors in military suicide, the acquired capability may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide. Future research directions, ways to enhance risk assessment, and treatment implications are also discussed.

2. Jessica D. Ribeiro, M.S., Jennifer Buchman, B.A., Theodore W. Bender, Ph.D., Matthew K. Nock, Ph.D., M. David Rudd, Ph.D., Craig J. Bryan, Psy.D., Ingrid C. Lim, Psy.D., Monty T. Baker, Ph.D., Chadwick Knight, M.H.S.A., Pete Gutierrez, Ph.D., & Thomas E. Joiner, Ph.D. (In Press). *Depression and Anxiety.* An investigation of the interactive effects of the acquired capability for suicide and acute agitation on suicidality in the Military.

Please see full copy of the above article in the appendices.

Abstract

According to the interpersonal theory of suicide (Joiner, 2005; Van Orden et al., 2010), the difficulties inherently associated with death by suicide deter many individuals from engaging in suicidal behavior. Consistent with the notion that suicidal behavior is fearsome, acute and heightened states of arousal are commonly observed in individuals immediately prior to lethal and near-lethal suicidal behavior. When considered through the lens of the interpersonal theory, acute states of heightened arousal may be relevant to suicidal behavior particularly when considered in the context of the acquired capability for suicide. In the present project we examine how acute agitation may interact with acquired capability to predict suicidality in a large military sample (n = 1,208). We suggest that among individuals who possess the requisite levels of pain tolerance and fearlessness about pain, injury, and death, the heightened state of arousal experienced during periods of acute agitation may facilitate suicidal behavior in part because it would provide the necessary energy to approach a potentially lethal stimulus. Among individuals who are low on acquired capability, the arousal experienced during agitation may result in further avoidance. Results from hierarchical multiple regression analyses were in line with hypotheses: among individuals high on acquired capability, as agitation increases, suicidality increases whereas as agitation increases among individuals low on acquired capability, suicidality decreases. Findings are discussed with respect to the interpersonal theory of suicide as well as alternative theoretical perspectives. Limitations of the study are noted. Implications for both theory and practice are offered.

3. Bender, T.W., Ribeiro, J.D., Michaels, M., Selby, E.A., Knight, C., Lim, I., & Joiner, T.E. Evaluating the Interpersonal Theory of Suicidal Behavior in an Active Duty Military Sample (*in submission; Journal of Affective Disorders).*

Please see full copy of the above article in the appendices.

Abstract:

Suicidal behavior is a major concern for US Military personnel and veterans. It is a top priority to ensure that service members who experience suicidal are identified and treated efficiently and effectively. One potential way to improve our current understanding of suicidality in the military is by examining the facets of the Interpersonal Theory of Suicide (IPT; Joiner, 2005) in military populations. Doing so may improve our assessment methods as well as facilitate our ability to treat military populations and veterans with increased risk for suicidal behavior. The current study aimed to evaluate the three facets of the IPT (i.e. perceived burdensomeness, thwarted belongingness, and the acquired capability for suicidal behavior), and their interactions in an active duty sample of military recruiters (N=1208). Using data obtained during a brief screening administered during Army recruiter training, this study found evidence to support the role of all three IPT constructs in increased suicidal ideation. Furthermore, evidence for interactions between the facets of IPT was obtained, with trending evidence supporting a three-way interaction between the variables such that elevations in all three predicted the highest levels of suicidal ideation. Assessment and treatment implications using these measures are discussed, as are the theoretical implications of IPT on suicidality in the military.

4. Buchman, J., & Joiner, T.E. (Manuscript in Preperation). Differential item responding on a suicide measure in the military: An evaluation of the Depressive Symptoms Inventory – Suicidality Subscale

Abstract (paper not yet completed)

Suicide rates in the U.S. military are on the rise (The Military Suicide Report, 2012): in 2012, more active duty troops died by suicide than by combat-related means in Operation Enduring Freedom (The Military Suicide Report, 2012; Operation Enduring Freedom, 2012). According to the Department of Defense Suicide Event Report for 2011, the majority of services members who attempted or died by suicide did not communicate their intent prior to making an attempt (75.83% and 73.87%, respectively). Such findings

implore an investigation of the utility and validity of standardized suicide risk assessments within military populations.

The current study compared responses to the Depressive Symptoms Inventory –Suicidality Subscale (DSI-SS; Metalsky & Joiner, 1997) in two samples: 1,208 Army recruiters enrolled in The Recruiting and Retention School (RRS) at Fort Jackson, South Carolina and 1,467 undergraduate students enrolled in psychology courses at a large southeastern university. Preliminary exploratory factor analyses (EFA) were run in both populations to determine the factorial loading of the four DSI-SS items. Results indicate a differential loading between the two samples such that within the undergraduate sample, all items loaded onto one factor, which is in line with previous research suggesting that the items of the DSI-SS load onto one factor of suicidality (Joiner, Pfaff, & Acres, 2002). Within the Army population, however, EFA results deviated from the expected factorial loading and two factors were extracted. Specifically, the DSI-SS item assessing for plans and preparations for a suicide attempt loaded onto a second factor within the sample of Army recruiters while the remaining three questions which assess thoughts of death/suicide, perceived controllability of suicidal thoughts, and suicidal impulses, all loaded onto a separate factor.

These finding suggest that individuals with the U.S. Army may be responding in a different manner to questions on the DSI-SS than other populations. Future research should determine if military members are less likely to endorse plans and preparations for an attempt than non-military members. Additionally, research into factors which may influence item responses (such as the real or perceived influence of suicidality on military enrollment) and alternative measures of suicidal ideation and behavior may be warranted to obtain an accurate assessment of imminent suicide risk within military populations.

5. Chiurliza, B., Michaels, M., & Joiner, T.E. (manuscript in preparation). The Role of Acquired Capability in American Indian Suicide.

Abstract (Manuscript in preparation)

Abstract: National suicide data collected over decades by the CDC has shown that American Indian populations have steadily maintained the highest rate of deaths by suicide in comparison to all other racial/ethnic groups. While there is a substantial amount of pain research suggesting that American Indians may have a higher tolerance for pain than other ethnic groups, there is a dearth of research bridging the gap between this relevant research and the phenomenon of considerably high suicide rates among American Indians. The present study attempts to address this need by illustrating how ethnicity maps onto the Acquired Capability for Suicide, a theoretical construct from the Interpersonal Theory of Suicide (Joiner et al.2005; Van Orden et al., 2010) that is partially comprised of pain tolerance. Multiple questionnaires, among which four items measured different aspects of Acquired Capability, were administered to sample of 3396 army recruiters. A Multivariate Analysis of Variance (MANOVA) will be conducted to compare total scores on these four items and the scores on each individual item across 6 different ethnic classifications (American Indian, Asian, African American, Hispanic, Caucasion, Hawaiian/Pacific Islander, and other).

6. Hames, J. L., Bodell, L. P., Buchman-Schmitt, J. M., Chu, C., Chiurliza, B., Michaels, M. S., Ribeiro, J. D., Nadorff, M. R., Winer, E. S., Rudd, M. D., & Joiner, T. E. (in prep). Insomnia is lonely.

Partial Abstract below

There is quite a bit of evidence that loneliness leads to insomnia, but no studies to date have assessed whether the opposite direction of the effect also holds true (i.e., that insomnia predicts loneliness). We have tested and found evidence for this in six separate samples, including Ft. Jackson.

Key Research Accomplishments

1. Findings suggest that although there are many important factors in military suicide, the acquired capability may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide.

2. Among individuals high on acquired capability, as agitation increases, suicidality increases whereas as agitation increases among individuals low on acquired capability, suicidality decreases.

3. Emerging evidence from this data support the role of all three IPT constructs (perceived burdernsomeness, thwarted belongingness, and acquired capability) in increased suicidal ideation. Furthermore, evidence for interactions between the facets of IPT was obtained, with trending evidence supporting a three-way interaction between the variables such that elevations in all three predicted the highest levels of suicidal ideation.

Reportable Outcomes

Manuscripts, Abstracts, Presentations:

Selby, E.A., Anestis, M.D., Bender, T.W., Ribeiro, J.D., Nock, M.K., Rudd, D.M., Bryan, C.J., Lim, I.C., Baker, M.T., Gutierrez, P.M., & Joiner, T.E. (2010). Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the Interpersonal-Psychological Theory of Suicide. *Clinical Psychology Review*. 30, 298-307.

Jessica D. Ribeiro, M.S., Jennifer Buchman, B.A., Theodore W. Bender, Ph.D., Matthew K. Nock, Ph.D., M. David Rudd, Ph.D., Craig J. Bryan, Psy.D., Ingrid C. Lim, Psy.D., Monty T. Baker, Ph.D., Chadwick Knight, M.H.S.A., Pete Gutierrez, Ph.D., & Thomas E. Joiner, Ph.D. *(In Press, Depression and Anxiety*). An investigation of the interactive effects of the acquired capability for suicide and acute agitation on suicidality in the Military.

Bender, T.W., Ribeiro, J.D., Michaels, M., Selby, E.A., Knight, C., Lim, I., & Joiner, T.E. Evaluating the Interpersonal Theory of Suicidal Behavior in an Active Duty Military Sample (*Journal of Affective Disorders, in submission*).

Chiurliza, B., Michaels, M., & Joiner, T.E. (manuscript in preparation). The Role of Acquired Capability in American Indian Suicide.

Buchman, J., & Joiner, T.E. (Manuscript in Preperation). Differential item responding on a suicide measure in the military: An evaluation of the Depressive Symptoms Inventory – Suicidality Subscale

Hames, J. L.**,** Bodell, L. P., Buchman-Schmitt, J. M., Chu, C., Chiurliza, B., Michaels, M. S., Ribeiro, J. D., Nadorff, M. R., Winer, E. S., Rudd, M. D., & Joiner, T. E. (in prep). Insomnia is lonely.

Degrees obtained that are/were supported by this award:

Theodore W. Bender, Ph.D.

Dr. Bender obtained his Ph.D. from Florida State University in 2012 while partially funded by the current award.

Michael D. Anestis, Ph.D.

Dr. Anestis attained his Ph.D. in 2011 while partially funded by this award. Additionally, he completed his Post-Doctorate from Florida State University while partially funded by this award.

Jessica Ribeiro, Ph.D.

Dr. Ribeiro attained her Ph.D. in 2014 while partially funded by this award. Additionally, she is completing her Post-Doctorate from Florida State University while partially funded by this award.

Chris Hagan, M.S.

Chris completed his Master's degree while partially funded by this award.

Caroline Silva, M.S.

Caroline completed her Master's degree while partially funded by this award.

Conclusion

As of now, baseline data collection is complete. Longitudinal tracking is nearly complete. We expect to adhere to the following revised approved statement of work.

Statement of Work

(With revised timeframes on remaining tasks including an approved no-cost extension until December 2014).

Task 1. Begin and complete baseline data collection; start longitudinal tracking:
1b. Complete baseline data collection (Completed December 2013).

Task 2. Continue and complete longitudinal tracking:
2a. Continue longitudinal tracking
2b. Complete longitudinal tracking (revised goal, December 2014).

Task 3. Data analysis; manuscript and report writing
3a. Complete data analyses and report writing (revised goal, December 2014).

The results of the above studies are beginning to suggest that among the three theory components, the acquired capability for suicide may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide. Agitation is also proving to be a useful risk factor to explore, according to our second study. It would appear that in individuals high on the acquired capability component, as agitation increases, the risk for suicide increases. The results of the above studies are to be considered as scientific knowledge.

References

Bender, T.W., Ribeiro, J.D., Michaels, M., Selby, E.A., Knight, C., Lim, I., & Joiner, T.E. Evaluating the Interpersonal Theory of Suicidal Behavior in an Active Duty Military Sample (in submission Journal of Affective Disorders).

Buchman, J., & Joiner, T.E. (Manuscript in Preperation). Differential item responding on a suicide measure in the military: An evaluation of the Depressive Symptoms Inventory – Suicidality Subscale

Chiurliza, B., Michaels, M., & Joiner, T.E. (manuscript in preparation). The Role of Acquired Capability in American Indian Suicide.

Hames, J. L.**,** Bodell, L. P., Buchman-Schmitt, J. M., Chu, C., Chiurliza, B., Michaels, M. S., Ribeiro, J. D., Nadorff, M. R., Winer, E. S., Rudd, M. D., & Joiner, T. E. (in prep). Insomnia is lonely.

Lorge, E. (2008). Army responds to rising suicide rates Retrieved September 17, 2008, from http://www.behavioralhealth.army.mil/news/20080131armyrespondtosuicide.html.

Ribeiro, J.D., M.S., Jennifer Buchman, B.A., Theodore W. Bender, Ph.D., Matthew K. Nock, Ph.D., M. David Rudd, Ph.D., Craig J. Bryan, Psy.D., Ingrid C. Lim, Psy.D., Monty T. Baker, Ph.D., Chadwick Knight, M.H.S.A., Pete Gutierrez, Ph.D., & Thomas E. Joiner, Ph.D. (In Press, Depression and Anxiety). An investigation of the interactive effects of the acquired capability for suicide and acute agitation on suicidality in the Military.

Selby, E.A., Anestis, M.D., Bender, T.W., Ribeiro, J.D., Nock, M.K., Rudd, D.M., Bryan, C.J., Lim, I.C., Baker, M.T., Gutierrez, P.M., & Joiner, T.E. (2010). Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the Interpersonal-Psychological Theory of Suicide. Clinical Psychology Review. 30, 298-307.

Appendices

Clinical Psychology Review 30 (2010) 298–307

Contents lists available at ScienceDirect

Clinical Psychology Review

Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the Interpersonal–Psychological Theory of Suicide

Edward A. Selby [a], Michael D. Anestis [a], Theodore W. Bender [a], Jessica D. Ribeiro [a], Matthew K. Nock [b], M. David Rudd [c], Craig J. Bryan [d], Ingrid C. Lim [e], Monty T. Baker [f], Peter M. Gutierrez [g], Thomas E. Joiner Jr. [a,]

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a r t i c l e i n f o

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a b s t r a c t

Suicide rates have been increasing in military personnel since the start of Operation Enduring Freedom and Operation Iraqi Freedom, and it is vital that efforts be made to advance suicide risk assessment techniques and treatment for members of the military who may be experiencing suicidal symptoms. One potential way to advance the understanding of suicide in the military is through the use of the Interpersonal–Psychological Theory of Suicide. This theory proposes that three necessary factors are needed to complete suicide: feelings that one does not belong with other people, feelings that one is a burden on others or society, and an acquired capability to overcome the fear and pain associated with suicide. This review analyzes the various ways that military service may influence suicidal behavior and integrates these findings into an overall framework with relevant practical implications. Findings suggest that although there are many important factors in military suicide, the acquired capability may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide. Future research directions, ways to enhance risk assessment, and treatment implications are also discussed.

Contents

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1. Military service and death by suicide

Suicide is a significant cause of death in the general population, with approximately one million deaths by suicide each year world-wide (National Institute of Mental Health, 2008). In the United States, the suicide rate is approximately 11 deaths by suicide for every 100,000 people (Benda, 2005). Thus, suicide is a major public health concern in the general community. Suicide is also the second most common cause of death in the United States Armed Forces, with rates of between 9 and 15 deaths by suicide per 100,000 people (Ritchie, Keppler, & Rothberg, 2003; U.S. Department of Defense, 2007). Although this is a similar rate of death by suicide as in the civilian population, the military suicide rate during times of peace is generally lower than the civilian rate (Kang & Bullman, 2008). Furthermore, previous studies have indicated that military service may be a risk factor for suicidal behavior (Kaplan, Huguet, McFarland & Newsom, 2007), and that the most common type of traumatic death suffered during armed forces training was suicide (Scoville, Gardner, & Potter, 2004).

In recent years the suicide rate of military personnel and veterans appears to be rising (Kang & Bullman, 2008; Lorge, 2008), which has sparked a pressing interest in better ways to identify suicidal ideation and treat those military personnel who are affected. Since the start of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), the suicide rate for military personnel who have seen combat has increased to that of the general population (Kang & Bullman, 2008), and perhaps beyond. This alarming increase suggests that exposure to combat may be an important factor that may cause or at least contribute to later death by suicide. At the same time, military service appears to have some qualities that lower suicide risk in times of peace, with deaths by suicide during basic training being as low as 5 deaths for every 100,000 military recruits (Scoville et al., 2004). Thus, the relationship between military service and suicidal behavior appears to be quite complex, serving as a risk factor for some and a protective factor for others.

Unfortunately, research on the mechanisms through which military service influences suicide risk one way or the other is sparse. Employing new theoretical approaches to suicide may shed light on the recent alarming elevation in suicide rate, and aid military health professionals in providing efficient, economical, and effective assess-ments and treatment for suicidality. The purpose of this review is to integrate current research on the psychological effects of military service and training, and evaluate how those effects may influence suicidal behavior through the framework of the Interpersonal– Psychological Theory of Suicide (IPTS; Joiner, 2005). Using this theoretical framework the many influences of military service on suicidal behavior may be illuminated, which may, in turn, suggest important assessment strategies and treatment implications.

2. The Interpersonal–Psychological Theory of Suicide

In his Interpersonal–Psychological Theory of Suicide, Joiner (2005) delineates a theory of suicidal behavior that focuses on three necessary, jointly sufficient variables that must be present for an individual to make a lethal suicide attempt: thwarted belongingness, perceived burdensomeness, and the acquired capability to enact lethal

self-injury. These three domains can be used to determine not only who desires to die by suicide, but also who is most capable of engaging in lethal suicidal behavior. This determination is important because there is evidence that although approximately 15% of the U.S. population seriously considers suicide at some point in the course of their life (Nock, Borges, Bromet, Alonso et al., 2008), only 1.4% of the population actually dies by suicide (Nock, Borges, Bromet, Cha et al., 2008). Importantly, the suicide attempt to completion ratio is estimated to be 25 to 1, further indicating that a substantial number of people try to die by suicide, but only a few do, many of whom do so only after multiple previous attempts (McIntosh, 2009). Thus, there appears to be something preventing many suicidal people from dying by suicide, despite their desire. IPTS suggests that all three aforemen-tioned domains must be present for extreme suicidal behavior, and that the low base rate of individuals exhibiting sufficiently high levels of all three factors is what accounts for the low suicide death rate. In order to better understand suicide in the military, we will describe the IPTS in more detail. As will be discussed later on, there may be many important aspects of military service that may influence these variables, some for the better, others for the worse.

2.1. The desire for death

Perceptions of burdensomeness and thwarted belongingness constitute what the IPTS refers to as a "desire for death." Essentially, it is through the combination of these two constructs that IPTS attempts to answer why someone would want to die by suicide. The more intense the combination of these factors, the more intense one's suicidal ideation is likely to be.

Thwarted belongingness, as conceptualized in the IPTS, is defined as an unmet need to belong that involves a lack of frequent, positive social interactions, and feelings of not being cared about by others (Baumeister & Leary, 1995). The "thwarted" aspect of belongingness indicates that, although some individuals may attempt to meet desires to belong, there may be barriers that are preventing them from successfully doing so. Thwarted belongingness is applicable to individuals who genuinely lack social support networks, as well as individuals who have contact with family and friends but feel that they are not genuinely connected to those individuals. Studies have found the construct of thwarted belongingness to be highly related to suicidal ideation (Van Orden, Witte, Gordon, Bender, & Joiner, 2008), suicide attempts (Conner, Britton, Sworts, & Joiner, 2007; Witte, Duberstein, Conwell, Beckman, & Joiner, in preparation), and completed suicide (Joiner, Hollar, & Van Orden, 2006). Instances of increased connection to others, on the other hand, have been linked to decreases in death by suicide (Joiner et al., 2006).

The second component of a desire for death is perceived burden-someness. This domain of the IPTS involves a sense on the part of the individual that he or she is a burden to others around him/her, not only failing to make meaningful contributions to society, but also serving as a liability to others. Because of these feelings, the individual assumes that his or her death is worth more to others than his or her life. It is important to note the "perceived" component, as those who believe they are a burden may feel this way despite evidence to the contrary. Perceived burdensomeness has been linked to suicidal ideation (Van Orden et al., 2008), attempted suicide (Joiner et al., 2009, 2002; Van

Orden et al., 2008), and death by suicide (Joiner et al., 2002; Pettit et al., 2002).

There is also evidence indicating that there is an interaction between perceived burdensomeness and thwarted belongingness which predicts increased suicidal ideation and more previous suicide attempts (Joiner et al., 2009). Although military service may influence both of these factors in different ways, these factors may not be where military service most directly influences suicide risk. The primary influence of military experience on suicidal behavior, as we hope to demonstrate through this review, may lie with the final domain of the IPTS, acquired capability.

2.2. Acquired capability

Although perceived burdensomeness and thwarted belongingness explain why someone might desire death, the acquired capability for lethal self-injury (hereafter referred to simply as acquired capability) postulates who is capable of death by suicide. Acquired capability involves the degree to which an individual is able to withstand the fear of death, an outcome that is psychologically frightening and likely to be physically painful. Joiner (2005) posited that, because a lethal or near-lethal suicide attempt is extremely fear-inducing and often involves intense physical pain, experience with and habituation to the fear and pain involved is a prerequisite for a serious suicide attempt. It is this variable that separates individuals who desire to die by suicide but do not attempt or do so using a very low lethality method, from those who actually make a nearly lethal attempt or die by suicide.

The IPTS suggests that acquired capability is developed over time through repeated exposure to painful and provocative events. Through the experience of painful and provocative events, pain and fear become less aversive and easier to tolerate. Joiner (2005) argues that this process mirrors the manner in which jumping out of a plane for skydiving, or parachute training in the case of the military, results in terror the first time one does it, but results in significantly less terror with each subsequent jump. A similar process may exist with suicidal behavior. Consistent with this possibility, Van Orden et al. (2008) found that individuals with previous suicide attempts and greater exposure to painful and provocative events (a composite variable of non-suicidal self-injury, exposure to violence, aggression, etc.) may be more capable of self-injurious behaviors than those who have not experienced those events. Acquired capability and experi-ence with painful and provocative experiences have been linked to number of previous suicide attempts (Joiner et al., 2005, 2007, 2009; Van Orden et al., 2008) and death by suicide (Brown, Beck, Steer, & Grisham, 2000; Holm-Denoma et al., 2008).

2.3. The combined desire for death and acquired capability

Although the purpose of this review is not to extensively present evidence supporting the IPTS in general, it is important to point out two recent studies testing this theory in order to illustrate the empirical foundation upon which it is built. The first study, conducted by Van Orden et al. (2008), found an interaction between perceived burdensomeness and thwarted belongingness significantly predicted suicidal ideation and that individuals with more previous suicide attempts exhibited higher scores on a measure of acquired capability. They also found an interaction between acquired capability and perceived burdensomeness predicted clinician-rated suicide risk. The second study, conducted by Joiner et al. (2009), found an interaction between low family social support and feelings that one does not matter (perceived burdensomeness) that predicted suicidal ideation beyond measures of depression. This second study also found that the three-way interaction between measures of thwarted belongingness and perceived burdensomeness, and previous number of suicide attempts (as a proxy for acquired capability), predicted current suicide attempt status, again beyond indices of depression and other covariates. Thus, although IPTS is a relatively new theory, there appears to be accumulating evidence supporting its ability to predict suicidal ideation and behavior.

3. Military service and mental health

Before discussing IPTS factors in relation to military service, it is important to understand the influences of military service on mental health. The psychological effects of military service in general, and combat exposure in particular, go beyond suicidal behavior and can involve problems with depression, anxiety, and substance use, among others.

3.1. Negative psychological effects of combat exposure and training

Former President Dwight Eisenhower once said of combat: “I hate war as only a soldier who has lived it can, only as one who has seen its brutality, its futility, its stupidity.” This quote appropriately sum-marizes the experience of combat, an experience that, for most, is difficult; for many incomparably so. It is also an experience that can be difficult to comprehend if one has never seen it. In this review we define combat as the in vivo experience of wartime conflict including actual engagement in conflict with armed, hostile forces, as well as witnessing such conflict. Although this is a rather broad definition, the theaters of war vary tremendously, as do the opposing forces. Furthermore, civilians can also experience combat, even if they are not actively engaged in the conflict. Thus, this definition is inclusive of conflict, or witnessing thereof, with legitimate armed forces, guerrilla forces, or terrorist organizations.

There is no doubt that engaging in combat is a terrifying experience for most who experience it, although with enough experience that fear, like any other, may decrease through habitua-tion. Yet, despite the difficulties and potentially horrifying experi-ences, the majority of those who enter theaters of war remain relatively unaffected (Hotopf et al., 2006). This can be seen in previous studies in which approximately 30% of military personnel developed psychological symptoms as a result of combat experience (Schlenger et al., 1992). Although many who see combat may have some problematic reactions, for many those problems may not be to the point of causing clinical impairment. It is also possible that many problems go unreported. Despite the finding that most seem to be unaffected, there remains a large minority of individuals who experiences combat who do develop clinically significant symptoms. For example, there is evidence that veterans of OIF are experiencing higher rates of mental health problems, with approximately 20% of active duty and 42% of reserve personnel reporting problems severe enough to require mental health treatment (Milliken, Auchterlonie, & Hoge, 2007). Furthermore, there appears to be a strong dose– response relationship between amount of combat exposure and severity of mental health problems (Dohrenwend et al., 2006). Thus, increased frequency and intensity of combat exposure may be better predictors of negative psychological outcomes than predisposing factors or brief combat exposure (Hoge et al., 2004; Hoge & Castro, 2006).

3.2. Risk factors for problematic outcomes following combat exposure

Some of the most important predictors for development of problems and psychopathology following combat exposure include previous trauma history (accidents, assaults, and natural disasters) and younger age (King, King, Foy, & Gudanowski, 1996), pre-combat history of psychiatric illness (Brewin, Andrews, & Valentine, 2000), problematic family relationships prior to combat (Iverson et al., 2007), and lower intellectual ability (Gale et al., 2008). Other risk factors include exposure to prior trauma and sexual abuse (Clancy et al., 2006; Cabrera, Hoge, Bliese, Castro, & Messer, 2007), exposure to a mentally

ill person in the home, exposure to alcoholism in the home, psychological abuse, and violence directed against one's mother (Cabrera et al., 2007).

3.3. Military service and psychopathology

Exposure to combat zones has been shown to increase rates of somatic symptoms, psychological distress, impaired health status, and greater health-related physical and social impairment in functioning (The Iowa Persian Gulf Study Group, 1997). Various studies have shown that exposure to combat is a risk factor for elevated symptoms of depression (Lapierre, Schwegler, & LaBauve, 2007), posttraumatic stress disorder (PTSD; Bullman & Kang, 1994; Clancy et al., 2006; Elbogen, Beckham, Butterfield, Swartz, & Swanson, 2008; Hoge et al., 2004; Hoge, Terhakopian, Castro, Messer, & Engel, 2007; Koenen, Stellman, Stellman, & Sommer, 2003), and abuse of alcohol and other substances (Hooper et al., 2008; Jacobson et al., 2008; Prigerson, Maciejewski, & Rosenheck, 2002). Many of these psychological symptoms have been found to last throughout the lifetime of the individual (Ikin et al., 2007).

Psychopathology may influence suicidal behavior in combat veterans due to increased problems with families, difficulties at work, and by increasing acquired capability. For example, depression can cause difficulty with loneliness and lack of connection, feelings of worthlessness, and difficulty maintaining energy to keep up with an occupation or with family. Those who experience injuries during combat also endorse more depressive and suicidal symptoms (Koren, Norman, Cohen, Berman, & Klein, 2005; Pitman, Altman, & Macklin, 1989). PTSD is strongly linked to suicidal behavior (Kessler, 2000), and it is a major predictor of who transitions from suicidal ideation to attempting suicide (Nock et al., 2009). It is also important to note that there are clinical features commonly experienced by those with PTSD, including, agitation, insomnia, and nightmares; these same clinical features have also been identified as risk factors for suicidal behavior (Bernert et al., 2005; Fawcett et al., 1990). Substance abuse problems can influence the domains of IPTS in many ways. For example, illicit substances may provide additional methods for death by suicide (e.g., intentional overdose). They may lower the suicidal ideation threshold needed for the individual to attempt suicide (e.g., drugs may facilitate a suicide attempt). Those abusing substances may also drive away those close to them through drug seeking and reckless behavior. Finally, substance use may also increase acquired capability as it may lead the individual to engage in more provocative behaviors (e.g., fighting, criminal activities, and reckless injuries), and some may require self-inflicted pain (e.g., intravenous drug administration).

4. Evaluating the link between military service and suicide with the IPTS

There are many ways in which military service may influence suicidal behavior. Some aspects may increase risk for suicidal behavior, while other aspects of the military may protect against it. We will now detail and discuss the negative influences of military service on each of the three domains of the IPTS. Furthermore, in our discussion of perceived burdensomeness and thwarted belongingness, we will discuss the positive influences of military service, as it is likely that there are many aspects of military service that facilitate increased feelings of belonging and attenuate perceived burdensomeness.

Of the three components of the IPTS, we believe that acquired capability is the most important factor in understanding suicide in the military. This is because unlike thwarted belongingness and perceived burdensomeness — which may be mitigated by military service for some — acquired capability is likely to be universally increased by military service through combat exposure and training. If one has been trained to kill enemies, and trained to overcome significant reservations in doing so, as well as to withstand other hardships, the same habituation process may generalize to include facing death by suicide, if suicidal ideation is present.

4.1. Combat experience and acquired capability

We begin with the role of combat exposure in acquired capability, as this is the aspect of suicide risk we believe is most profoundly impacted by military service. IPTS posits that acquired capability is developed in response to repeated exposure to painful and fear-inducing situations. Combat exposure is, without a doubt, a source of exposure to pain, fear, and death. Witnessing fellow soldiers severely injured and killed, and killing enemy combatants, are likely to be distressing experiences for most, yet that distress may be attenuated with repetition.

In general, increased suicidal ideation is associated with greater exposure to war zone violence and atrocities (Yehuda, Southwick, & Giller, 1992; Beckham, Feldman, & Kirby, 1998), and witnessing war time atrocities (e.g., mutilated bodies or mass killings; Sareen et al., 2007). Findings on actual death by suicide more directly highlight the link between combat exposure and acquired capability. For example, recent evidence suggests that exposure to combat may be increasing the suicide rate of soldiers from OIF and OEF (Kang & Bullman, 2008). Length of tour of duty has also been associated with death by suicide in Vietnam veterans (Adams, Barton, Mitchell, Moore, & Einagel, 1998), a finding that may also be relevant to OIF and OEF, as tours of duty for these theaters are longer than previous wars, and multiple tours of duty are common (Tanielian & Jaycox, 2008). In fact, an Institute of Medicine committee reviewed numerous studies of Vietnam veterans and concluded that there is significant evidence supporting a relationship between deployment to a war zone and suicide in the years after deployment (Institute of Medicine, 2007).

The evidence presented thus far does not directly support the role of combat exposure increasing acquired capability, and thus suicide potential, per se. Direct evidence is less available, as IPTS is a relatively new theory and has not yet been tested extensively in military populations. One study that specifically explored variables from the IPTS in a military sample found that U.S. Air Force personnel who died by suicide were rated as having higher scores on a scale of acquired capability than a comparison sample of active duty air force personnel (Nademin et al., 2008). It was unclear in this study, however, if there were differences between the two groups in amount of combat exposure, and the group differences in acquired capability may have been present prior to military service. In another study using a military sample, Bryan, Morrow, Anestis, and Joiner (2010) found that active duty members of the United States Air Force exhibited higher levels of acquired capability than did a non-military clinical sample. Active duty soldiers did not differ from the non-military sample on measures of perceived burdensomeness or thwarted belongingness; however, the authors found that an interaction between acquired capability and perceived burdensomeness which predicted suicidal symptoms such that higher levels of both corresponded with highly elevated suicidality.

Although actual acquired capability has not received much attention in explaining military suicide rates, there are other findings that are consistent with the IPTS view that combat exposure is likely to increase acquired capability. For example, one study found that, in comparison to the general population, Vietnam veterans who had been hospitalized for combat wounds were at higher risk for suicide (Bullman & Kang, 1996). Furthermore, this study also found that those wounded more than once and those with more severe injuries had the highest risk of suicide. Along these lines, elevated suicide rates have also been documented in combat veterans who experienced ampu-tation of a limb (Bakalim, 1969), as well those who experienced spinal cord injuries (Nyquist & Borg, 1967). Different branches of the military may also experience more injuries, which may increase suicide risk. For example, one study of Vietnam veterans found that

individuals in the Army were seven times more likely to die by suicide than were veterans in the other military branches (Adams et al., 1998).

Posttraumatic stress symptoms may also contribute to increased acquired capability through mental habituation to pain and death. In a sample of Vietnam War veterans, Bell and Nye (2007) found that re-experiencing symptoms of PTSD are more highly predictive of suicidal ideation than are other symptoms of the disorder. In turn, re-experiencing symptoms of PTSD have been shown to be associated with the degree to which individuals have been exposed to war atrocities and heavy violence, with greater exposure resulting in more severe symptoms (Hendin & Haas, 1991; Hartl, Rosen, Drescher, Lee, & Gusman, 2005). Nightmares, which have been linked to suicidal behavior (Bernert et al., 2005) and are a common symptom of PTSD, may be an additional form of re-experiencing painful and provocative events.

There may also be indirect routes to developing acquired capability that are a result of combat exposure. There is evidence that many who experience combat may develop a sense of "invincibility," which may lead them to engage in more risky and dangerous behaviors. For example, more exposure to violent combat, killing another person, and more contact with human trauma were all associated with more risk-related behaviors including substance abuse and physical aggression (Killgore et al., 2008). Another study found that depressed and substance-abusing military personnel who have seen combat are almost as likely to die from reckless accidental death as they are to die by suicide (Thoresen & Mehlum, 2004). These findings indicate that some soldiers who experience combat may develop a fearlessness that leads them to engage in more reckless behaviors such as thrill seeking and substance abuse, a consequence of which may be the experience of pain and provocation. Thus, the same invincibility or fearlessness that develops from combat exposure for some may also have the potential to be used in violence against oneself.

Overall, combat exposure appears to have many negative influences on suicidal behavior. There are numerous ways through which combat exposure may contribute to suicidal behavior in military personnel: witnessing violence against others and against one's fellow service members, enacting violence against others, and experiencing multiple and/or severe injuries in combat are all likely to increase acquired capability. The constant threat of loss of life and severe injury may also cause habitation to fear of death and pain.

4.2. Combat training and acquired capability

Training for combat situations may also contribute to the acquired capability for suicide for all who serve in the military, as intense combat training is required of all who serve. Military training often necessarily involves exposure to the use of violent weapons, simulated combat activities, and other intense situations. The more thoroughly an individual is trained to carry out these activities, the less difficult it may be to engage in real combat situations. Such training may also facilitate imperviousness to fears of death and injury. Although not an extensively studied topic, there does appear to be some evidence that those in the military have a decreased fear of death. Male veterans, in general, appear more likely to utilize firearms in death by suicide (Kaplan et al., 2007), despite many of them not having seen combat. Another study found that both military officers and their wives had decreased fear of death compared to non-military groups (Koob & Davis, 1977). This may be a result of habituation to the threat of death that is often a part of military life, and may be evidence for increased acquired capability. There is also evidence that members of high death-risk occupations, including those in military service, may attempt to deny, suppress, or control anxiety about death (Lewis, Espe-Pfeifer, & Blair, 2000).

One potential area for combat training to increase acquired capability is through severe and/or repeated injuries, as injuries are common in intensive military training (Munnoch & Bridger, 2007). The Army reports that over the last two decades number of recruits injured during basic training ranged from 15% to 35% for men and from 40% to 60% for women (Jones, 1983; Cowan et al., 1988; Knapik et al., 1998). There is also evidence that male Army personnel may obtain injuries due to physical fights when off-duty (Tiesman, Peek- Asa, Zwerling, Sprince, & Amoroso, 2007).

Branch of military training may also influence acquired capability. Suicide rates during basic training were found to be higher in the Army and Marines than in the Air Force and Navy (Scoville et al., 2004); this may be because Army and Marines may have more provocative combat training than the latter two. That is, the latter two may focus more on operational training for ships and aircraft, rather than for direct combat. It is important to note, however, that self-selection may lead individuals with higher levels of acquired capability to enlist in these two branches. Self-selection would not necessarily negate the hypothesis that greater training results in greater increases in acquired capability, but it would obscure inter-pretations of simple group differences.

The specific training that individuals in the military receive may result in more habituation for different forms of provocation. If one is trained to use guns in combat, the use of a gun in suicide may not invoke as much fear as other potential methods. As an illustration, Scoville et al. (2004) listed a number of cases of soldiers who died by suicide. From the cases listed, those who jumped tended to be in the Air Force (decreased fear of heights), those who hung themselves tended to be in the Navy (extensive experience with rope and knots), and those who shot themselves tended to be in the Army or Marines (extensive training with guns). Thus, training with exposure to activities that could be used for suicide may increase habituation to that activity, making its use for suicide less fear provoking.

Despite the constant supervision of soldiers during training and the potential bonds that are formed with fellow recruits, some individuals die by suicide during basic training. In the aforementioned study by Scoville et al. (2004), one of the most common suicide methods during training was self-inflicted gunshot wounds incurred at marksmanship training. This is a surprising finding, given that the soldiers would do this while surrounded by other soldiers, rather than when they were alone. The finding that suicide method may be influenced by occupational access to lethal weapons is further exemplified by the findings of a case–control study in which soldiers who died by suicide tended to do so while on duty, using weapons they acquired as a part of their shift (Mahon, Tobin, Cusack, Kelleher, & Malone, 2005). Interestingly, most of these deaths by suicide occurred during the morning shift, shortly after coming on duty. Thus, understanding the manner in which combat training influences the acquired capability for suicidal behavior may aid in suicide risk assessment.

4.3. Military service and thwarted belongingness

Particular aspects of military service may influence thwarted belongingness in various ways, particularly in veterans who have seen combat and, as a result, have difficulty relating to their family and friends who may have trouble understanding such experiences, or newer personnel who fail to make connections with fellow recruits. But first, it is important to begin with a brief discussion of the positive influence that military service can have on feelings of belonging. Those in the military may form strong bonds and camaraderie with those with whom they serve or train. For example, military personnel may find ways of increasing group coherence through various activities (e.g., acquiring identical tattoos; Coe et al., 1993). This behavior may seem trivial in some ways, but a tattoo may be a strong reminder of a connection with others. Combat experience may also foster the connections that soldiers have with each other, perhaps creating a "brothers-in-arms" bond. For example, the rate of suicide during military basic training is lower than the age-equivalent suicide

rate for the general population (Scoville, Gubata, Potter, White, & Pearse, 2007). Military training may also instill improved ways of handling interpersonal conflict for some, which may benefit non-military relationships. For example, divorce rates of US Air Force Academy graduates are lower than the divorce rate in the general population (McCone & O'Donnell, 2006). Thus, military training may facilitate one's ability to establish and maintain healthy relationships, both in and outside of the military.

Combat experience may be a factor that increases thwarted belongingness for some individuals, however. For example, when veterans return home they may find it hard to express the difficulties of their experiences to their friends and family, or they may feel out of place in civilian life. Similarly, if they fought in an unpopular war, many veterans may feel like they are viewed negatively by their community (Koenen et al., 2003). Taking the life of another may also be a factor that instills thwarted belongingness. For example, guilt about actions during combat has been linked to more severe PTSD symptoms (Henning & Frueh, 1997). These same feelings of guilt may also contribute to feelings of isolation and lack of belonging, perhaps due to thoughts such as "I'm unlovable because of what I've done…" Importantly, this study also found that guilt was particularly associated with the re-experiencing symptoms of PTSD, which we suggested earlier may also increase acquired capability.

Combat deployment causes a great deal of stress on the families of those deployed, and this stress likely contributes to family problems that arise during and after deployment. Parental deployment has been linked to behavioral and academic problems in children (Caselli & Motta, 1995; Levai, Kaplan, Ackerman, & Hammock, 1995; Hiew, 1992). Combat deployment has also been linked to later domestic violence and child maltreatment (Gibbs, Martin, Kupper, & Johnson, 2007), and increased intimate partner violence (Marshall, Panuzio, & Taft, 2005). More combat exposure is a negative indicator of family adjustment after return from a warzone for both men and women (Taft, Schumm, Panuzio, & Proctor, 2008), and combat exposure has also been linked to divorce (Prigerson, Maciejewski, & Rosenheck, 2002).

What is it about combat experience that results in negative interpersonal outcomes? One potential mechanism may be the mistrust that can result from combat. Hypervigilance and paranoid ideation have been found to be significantly correlated with combat exposure (Orsillo, Roemer, Litz, Ehlich, & Friedman, 1998), and these states of mind may be beneficial to the soldier in the combat zone because they may aid survival. But when integrating back into civilian life these experiences may cause difficulties with their families because of constantly being "on-guard." Another potential mecha-nism may be "emotional numbing," often a symptom of PTSD, that may arise from combat exposure. One study found that Vietnam veterans who experienced emotional numbing reported more interpersonal difficulties and lower overall quality of relationships with their children (Ruscio, Weathers, King, & King, 2002).

As has already been mentioned, military training may facilitate feelings of belonging to a group in some individuals, but for those soldiers who have difficulty connecting with others prior to military training, military experience may actually serve to further aggravate a sense of thwarted belongingness. If they are unable to form these bonds with their military peers, they may experience even stronger feelings of not belonging to the group or being the "odd man out." Non-military relationships may also be implicated. Two important risk factors for suicide in military personnel are living alone and breaking-up with a romantic partner (Farberow, Kang, & Bullman, 1990; Thoresen & Mehlum, 2006; Wong et al., 2001). Another study using psychological autopsy of soldiers found that being unmarried, divorced, or separated was a particularly potent risk factor for death by suicide (Thoresen, Mehlum, Roysamb, & Tonnessen, 2006). So, a global sense of belonging and connection to both military and non-military peers may provide the most protection against suicide.

4.4. Military service and perceived burdensomeness

Feelings of perceived burdensomeness may be a major influence on suicidal ideation for some military personnel. This may be particularly so for those wounded or disabled in combat. We will discuss evidence for perceived burdensomeness in the military shortly, but first there are many ways in which serving in the military may contribute to positive feelings of making a meaningful contribu-tion, thus protecting against perceptions of burdensomeness.

Military service is likely to be a positive occupational experience for most individuals, instilling feelings of honor, accomplishment, contributing to society, and having a sense of mission. Many military personnel may feel like they are part of a greater cause for their country and that they are helping to protect their family. In fact, feelings of pride about serving in the military have been found to exhibit significant negative correlations with a variety of negative outcomes (e.g., depression) in individuals involved in peacekeeping missions (Orsillo et al., 1998). Veterans of World War II and the Korean War reported that combat experience taught them how to cope with adversity and be self-disciplined, and it also instilled feelings of greater independence and broader perspectives on life (Elder & Clipp, 1989).

One review found that most veterans of war and peacekeeping reported more positive than negative effects of theater experience, and that those who viewed the combat as having an overall positive meaning (i.e., a good cause) also reported better psychological adjustment (Schok, Kleber, Elands, & Weerts, 2008). There is also evidence that many Vietnam veterans reported high levels of life satisfaction and attainment (Vogt, King, King, Savarese, & Suvak, 2004), including occupational attainment. Yet, this same study also found that these positive effects of military service were attenuated by exposure to combat, wartime atrocities, perceived threats, and malevolent environments.

For many individuals who experience feelings of positive contri-bution while serving in the military, a return from combat or discharge from the military may result in experiencing feelings of loss of purpose or perceived burdensomeness. While on the front lines or in the military, the individual may have felt a greater purpose; but, once discharged, the individual may feel like he or she has nothing more to contribute, or that he or she is a drain on society because of disabling injuries or other adjustment difficulties (Brenner et al., 2008). One study found that excessive motivation to excel in the Army was an important risk factor for completed suicide among soldiers who experienced combat (Bodner, Ben-Artzi, & Kaplan, 2006), suggesting that perhaps these same individuals were experiencing greater feelings of failure or perceived burdensomeness at the time of their deaths.

Perceptions of burdensomeness may be particularly increased if one abandons or is expelled from the military. One study of veteran Finnish peacekeepers found that those who did not complete their service commitment due to premature repatriation had increased suicide risk relative to those who completed their service (Ponteva et al., 2000). In another study, a psychological autopsy of soldiers who died by suicide found that involuntary repatriation was a significant risk factor for completed suicide (Thoresen et al., 2006). In a related note, military personnel who develop mental disorders have significantly higher than average rates of attrition from the military (Hoge et al., 2002). There is also some evidence that legal problems, misconduct, unauthorized absences, and substance use problems may mediate the relationship between psychological illness and early attrition from the military (Hoge et al., 2005). Thus, occupational difficulties and repatriation may lead to percep-tions of being a burden on the military, and these perceptions may be aggravated by feelings that they are not just failing their duties, but that they are personally failing and hurting their fellow soldiers and their country as well.

Another potential contributor to perceptions of burdensomeness may be survival guilt, an experience for some veterans who feel like they did not deserve to live through combat or that they should have died alongside their friends. These feelings of guilt may particularly contribute to perceived burdensomeness if the individual's action, or inaction, resulted in the death of a friend, perhaps causing feelings of responsibility or failure. These thoughts may then generalize to other aspects of life, through thoughts like, "I'm just making things worse for everyone, just like during the war…" Importantly, survival guilt has been linked to death by suicide in Vietnam veterans (Hyer, McCranie, Woods, & Boudewyns, 1990).

There are several other ways that the negative psychological effects of combat exposure may increase perceptions of burdensome-ness. Military personnel who are discharged or complete their service may face a difficult transition from serving their country to reengaging in a different component of society (e.g., previous occupations and returning to school). Those who remain in the military may also have trouble completing their duties due to mental health symptoms. One study found that military personnel are more likely to report "attitudinal barriers," such as concerns about being seen as weak or that unit leadership would treat them differently, to seeking out mental health services, rather than "structural barriers," such as the cost of health care (Hoge et al., 2004). Military personnel experiencing symptoms of PTSD may also experience increased feelings of being a burden on the military. One study of OIF veterans found that those with PTSD (approximately 16% of the sample) reported more sick call visits, more missed workdays, and more problems with physical health (Hoge et al., 2007). Furthermore, approximately one third of the homeless population consists of military veterans (Gamache, Rosenheck, & Tessler, 2003), a situation that may further increase perceived burdensomeness on family and/or society.

There are also scenarios where some soldiers may still be on active duty and experience feelings of burdensomeness. For example, if as a means of punishment or for safety precautions a soldier has his or her service weapon taken away, failing at a task assigned during duty which may result in feelings of failure and perceived humiliation, and/ or stern reprimands and/or harangues from superiors could contrib-ute to feelings of burdensomeness. Thus, attempts at "toughening" soldiers up may, for some, result in feelings of failure or being a burden.

4.5. Overall IPTS framework and summary

Overall, military experience is a positive experience for most who serve. Time spent in the military allows many individuals to develop deep bonds with others who serve beside them, fosters feelings of pride and fulfillment in serving one's country, and it may also provide a broader perspective on life. If an individual reports strong relation-ships with peers and family, and feels that he or she is making an active contribution to his or her country and community, he or she may be buffered from the negative influences of combat exposure and thus at less risk of suicide. Understanding the positive ways in which military experience has influenced the life of an individual may be beneficial for both suicide assessment and treatment.

Importantly, however, there appears to be a dose–response relationship of combat exposure and suicide risk, one that is strong enough that even these protective buffers may erode for some with multiple combat deployments. Most of the negative factors involved in the relationship between military service and suicidal behavior, and their relationships to the three domains of the IPTS, are displayed in Fig. 1. In this framework, pre-service risk factors (although not a comprehensive list) are displayed as feeding into psychopathology. One pre-service factor, experience with trauma, is also displayed with an arrow to acquired capability, as previous traumas may also contribute to acquired capability. These pre-service factors may then serve to influence the development of psychological disorders such as depression, PTSD, and substance use following combat exposure. Combat exposure may then contribute, through psychopa-thology in particular, to the three domains of the IPTS because of the interpersonal problems, functional and occupational difficulties, and through symptoms such as the re-experiencing symptoms of PTSD or the physical injuries that arise from substance use. Combat exposure may also have influences on suicidal behavior independent of psychological disorders, such as through directly increasing acquired capability. Thwarted belongingness, perceived burdensomeness, and acquired capability may be further developed through the mechan-isms listed beneath each domain of the IPTS. Risk for a lethal suicide attempt would increase, then, as more of these factors are endorsed by an individual. In this model we have also provided a larger and darker arrow for acquired capability for contributing to suicide risk because the evidence suggests that combat exposure and training may be the most profound and widespread negative impact of military service on suicide. Importantly, low endorsement of any of the IPTS domains may indicate less suicide risk.

5. Discussion

5.1. Future research directions

Little research has been conducted exploring the IPTS in military suicide; additional research on the IPTS domains in the military may be beneficial for helping U.S. military personnel. Future studies should explore perceptions of burdensomeness, thwarted belongingness, and levels of acquired capability in military samples, and then compare levels of these variables to community and clinical samples. Future studies should also assess whether initial levels of these variables change following basic training. Change in these variables should also be measured following deployment to war zones and direct combat exposure. Importantly, these variables should also be measured in relation to suicidal ideation and behavior in the military. Finally, evaluating use of IPTS domains in treating and assessing suicidal behavior in the military may also be a promising avenue of research.

5.2. Improving suicide screening and risk assessment

Regular screening of military personnel for suicidal symptoms may be an important way to prevent suicide in active duty personnel. One study of soldiers who died by suicide found that although many of these soldiers effectively maintained their military duties and expectations right up until death by suicide, they also demonstrated signs of emotional deterioration during the last days of their lives (Orbach et al., 2007). Thus, although a member of the military may appear to be functioning adequately, he or she may be masking suicidal ideation and preparation.

The domains of the IPTS may serve as important indicators of suicide risk assessment in clinical settings. Although research directly measuring these variables in the military are few, especially for acquired capability, several studies have reported findings that are consistent with these constructs (e.g., Anestis, Bryan, Cornette, & Joiner, 2009; Brenner et al., 2008; Kaplan et al., 2007). In clinical practice, actual measures of perceived burdensomeness, thwarted belongingness, and acquired capability may provide the most accurate assessment, but many of the variables displayed in Fig. 1 could be used to generate estimates of risk. When military personnel score high in all three of these areas, it may be important to take additional risk precautions to ensure safety.

Assessment may also be important in terms of what duties are assigned to military personnel. One study found that military personnel who had access to firearms as a part of their duties accounted for over 50% of suicides, with many of these incidents taking place while the individuals were on the job rather than off duty (Mahon et al., 2005). If an individual is designated at higher risk for

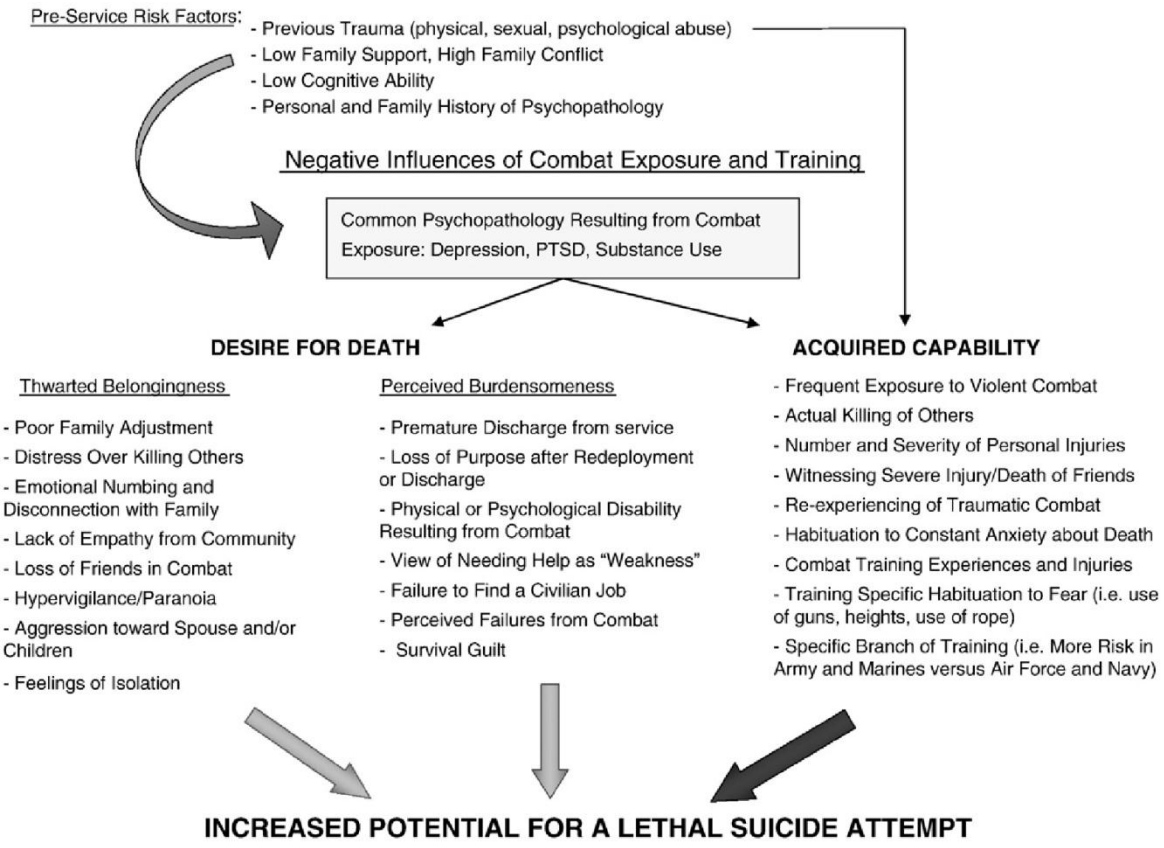

Fig. 1. Negative influences of military service on suicidal behavior as viewed through an IPTS lens.

suicide, it may be beneficial to reassign them to duties that do not have easy access to firearms. In reassigning the soldier, however, it may be important to monitor humiliation reactions that may arise. Similarly, training recruits determined to be at risk for suicide may need to be restricted from firearm training, as one study found that a high percentage of suicides during basic training took place during marksmanship training (Scoville et al., 2004).

5.3. Improving treatment for suicidality in the military

Numerous potentially useful approaches towards addressing thwarted belongingness and perceived burdensomeness exist. Al-though an ideal solution would involve ensuring improvement of the quality of relationships with non-military peers and family as well, increasing communication with fellow military personnel and veterans, with whom such soldiers could share experiences, might serve as an effective point of crisis intervention capable of mitigating severely thwarted belongingness. Programs such as Battlemind Transition Training, which is currently being researched at the Walter Reed Medical Center, could help veterans reintegrate into civilian life in a manner that helps maintain military relationships without neglecting non-military relationships, while simultaneously addres-sing a variety of mental health outcomes (Adler, Castro, Bliese, McGurk, & Miliken, 2007; Adler et al., 2006). Meaning-making may also be an important future avenue for therapy, as finding a higher meaning for combat and traumatic experiences could mitigate some of the deleterious effects of combat exposure (Schok et al., 2008). Strategies might include examining the potential positive contribu-tions made and highlighting personal growth from the experiences, hopefully decreasing perceived burdensomeness.

Although acquired capability may not be directly treatable, explaining to combat veterans how their experiences may have contributed to invincibility or fearlessness toward pain and death may help them maintain awareness of their increased risk. It could be communicated to military personnel in general that they should seek help immediately when they feel suicidal, not because they are weak, but to the contrary, because they may lack fear. This explanation may also help decrease cognitive barriers to seeking aid for mental health.

6. Conclusion

This review has highlighted evidence indicating the IPTS as a valuable framework for understanding, researching, assessing, and treating suicidal behavior in the military. Military experience may increase suicidal behavior, primarily due to the painful and provoc-ative situations resulting from combat, which may increase acquired capability and enhance one's ability to inflict lethal self-injury. Combat exposure may also result in feelings of thwarted belonging-ness and increased feelings of being a burden on others. When all three of these components are present, an individual's suicide risk is likely to be high. Suicide in the military is a complex phenomenon, but using the IPTS framework may help improve the situation for some of our nation's most valuable resources and the families of those who serve.

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An Investigation of the Interactive Effects of the Acquired Capability for Suicide and Acute Agitation on Suicidality in a Military Sample

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Abstract

According to the interpersonal theory of suicide (Joiner, 2005; Van Orden et al., 2010), the difficulties inherently associated with death by suicide deter many individuals from engaging in suicidal behavior. Consistent with the notion that suicidal behavior is fearsome, acute and heightened states of arousal are commonly observed in individuals immediately prior to lethal and near-lethal suicidal behavior. When considered through the lens of the interpersonal theory, acute states of heightened arousal may be relevant to suicidal behavior particularly when considered in the context of the acquired capability for suicide. In the

present project we examine how acute agitation may interact with acquired capability to predict suicidality in a large military sample (n = 1,208). We suggest that among individuals who possess the requisite levels of pain tolerance and fearlessness about pain, injury, and death, the heightened state of arousal experienced during periods of acute agitation may facilitate suicidal behavior in part because it would provide the necessary energy to approach a potentially lethal stimulus. Among individuals who are low on acquired capability, the arousal experienced during agitation may result in further avoidance. Results from hierarchical multiple regression analyses were in line with hypotheses: among individuals high on acquired capability, as agitation increases, suicidality increases whereas as agitation increases among individuals low on acquired capability, suicidality decreases. Findings are discussed with respect to the interpersonal theory of suicide as well as alternative theoretical perspectives. Limitations of the study are noted. Implications for both theory and practice are offered.

Keywords: agitation, acquired capability for suicide; suicide; suicidal behavior; interpersonal theory of suicide

Introduction

Suicide is a leading cause of death worldwide (World Health Organization, 2012). In the United States alone, more than 36,000 lives are lost to suicide annually, which corresponds to nearly 100 deaths by suicide per day. Even so, lethal suicidal behavior is still statistically rare. Having thoughts about suicide is much more common (Nock, Bromet, Borges, Cha, Kessler, & Lee, 2008). Nevertheless, even among individuals who desire suicide, evidence suggests that very few will attempt suicide and most attempts will not result in death (Nock et al., 2008). Many existing theories of suicide rest on the assumption that stronger suicidal desire is what differentiates individuals who die by suicide from those who may have thoughts about suicide but do not die. Consequently, these theories have largely focused on identifying factors that contribute to the desire for suicide. The interpersonal theory of suicide (Joiner, 2005; Van Orden et al., 2010) challenges this idea, suggesting that the desire for suicide is necessary but not sufficient for the prediction of lethal suicidal behavior. In order for lethal suicidal behavior to occur, according to the theory, an individual must have both the desire and capability for suicide.

The inherent difficulties associated with death by suicide deter many individuals from engaging in suicidal behavior, per the theory's account. One aspect, according to the theory, that makes suicide difficult is that it is instinctively fearsome as suicide requires confronting and overcoming strong, evolutionarily-based motives for self-preservation. A second deterring aspect is that lethal suicidal behavior is also often physically painful. The theory suggests that individuals who have acquired the capability for suicide, therefore, will evidence a sense of fearlessness about pain, injury and death as well as elevated tolerance for physical pain. According to the theory, because the capability is not fully innate, it must be developed over time. The primary mechanism by which it develops is through repeated exposure to pain and provocative experiences that are fear-inducing and/or painful (Joiner, 2005; Van Orden et al., 2010). For instance, non-fatal suicidal behavior, non-suicidal self-injury, combat exposure, physical aggression, among a host of others, represent fearsome and painful experiences that are thought to confer risk for developing the acquired capability for suicide.

Although the theory highlights the necessary role of acquired capability for suicide in lethal suicidal behavior, the capability for suicide alone is not sufficient to result in death by suicide. An individual must also

evidence the requisite level of suicidal desire. According to the interpersonal theory, the most severe form of active suicidal desire will occur only when two painful interpersonal states – namely, thwarted belongingness and perceived burdensomeness – are experienced simultaneously and perceived as global and unchanging (i.e., hopeless). Thwarted belongingness is characterized by a sense of loneliness and actual or perceived social disconnection. Perceptions of being a burden to others and the (often mistaken) belief that one's death may be worth more to others than one's life characterizes perceived burdensomeness.

A growing empirical literature of both direct and indirect evidence largely supports the main propositions of the interpersonal theory (see Van Orden et al., 2010 for a comprehensive review). With respect to acquired capability in particular, a strong literature exists indicating well-documented associations between suicidal behavior and an attenuated fear of death (Gutierrez, King, & Ghaziuddin, 1996; Minton & Brush, 1980; Neuringer, 1970; Orbach, Feshbach, Carlson & Ellenberg, 1984; Orbach, Kedem, Gorchover, Apter, & Tyano, 1993) and an elevated pain tolerance (Orbach et al., 1996a; Orbach et al., 1996b; Orbach, Mikulincer, King, Cohen, & Stein, 1997). Direct assessment of acquired capability has also repeatedly been linked to a range of painful and provocative experiences, including past suicidal behavior (Bender et al., 2011; Bryan, Cukrowicz, West, & Morrow, 2010; Franklin, Hessel, & Prinstein, 2011; Nademin et al., 2008; Smith, Cukrowicz, Poindexter, Hobson, & Cohen, 2010; Van Orden et al., 2008). Lastly, there is initial evidence supporting the hypothesized three-way interaction between thwarted belongingness, perceived burdensomeness, and acquired capability in predicting later suicidal behavior (Joiner et al., 2009).

Consistent with the interpersonal theory's view that suicidal behavior is fearsome, evidence indicates that acute and heightened states of arousal are commonly observed in individuals immediately prior to lethal and near-lethal suicidal behavior. When confronting any potential threat to survival, like those involved in suicidal behavior, the body's automatic and innate response is increased arousal – that is, the involuntary stress response, commonly referred to as the fight-or-flight response (Cannon, 1932). The direct biological consequence of being confronted with a potentially lethal stimulus is increased autonomic nervous system arousal, which in turn results in the release of catecholamines (i.e., epinephrine and norepinephrine) that prepare the individual for action (Cacioppo, 1994). The resulting increases in vigilance, heart rate, and oxygen circulation, for instance, prime the individual to either confront the threat (i.e., fight) or escape it (i.e., flight).

One particular state of acute and heightened arousal is acute agitation, often noted in the days and weeks before lethal or near-lethal suicidal behavior. Acute agitation has been identified through both empirical evidence and expert clinical consensus as a significant risk factor for imminent lethal and near-lethal suicidal behavior. As it relates to suicidal behavior, acute agitation is a time-limited state of both psychological and behavioral overarousal often characterized by restless and/or repetitive behaviors (such as fidgeting, pacing, hand-wringing, etc.) coupled with expressions of emotional turmoil and/or mental anguish, tension, or unrest (Benazzi, Koukopouloos, & Akiskal, 2004; McGuffin et al., 1991; Ribeiro, Bender, Selby, Hames, & Joiner, 2011). Experts have deemed agitation a leading warning sign for suicide (Rudd et al., 2006).

Bolstering expert consensus, retrospective, prospective, and cross-sectional studies have also documented high rates of acute agitation among suicide decedents present in the days and weeks prior to their deaths. In a set of psychological autopsies reported by Robins (1981), for instance, "nervousness" occurred in approximately 60% of suicide decedents prior to their deaths, placing it as the second most common symptom documented in the study; "tension" was also common among decedents, occurring in over 40% of the 134 suicide decedents studied. Retrospective studies of inpatient (e.g., Busch et al., 2003) and inmate (e.g., Way, Miraglia, Sawyer, Beer, & Eddy, 2004) suicide deaths report rates of agitation present in close to 80% of suicide decedents in the weeks before the deaths. Beyond retrospective reports, acute agitation has also been linked to imminent suicidal behavior prospectively. Evidence from a large longitudinal study of depressed patients identified agitation and related indicators (e.g., presence of panic attacks) as one of the strongest predictors of near-term death by suicide (Fawcett et al., 1990), occurring in significantly more patients who died by suicide within a year of baseline assessment compared to those who did not. Acute agitation has also been documented as a precursor of near-lethal attempts. Hall and colleagues (1999) reported that close to 90% of patients admitted to an emergency mental health care unit following an attempt reported experiencing "severe psychic anxiety" during the month preceding the attempt; close to 80% also endorsed panic attacks during that time period as well (Hall, Platt, & Hall, 1999).[1]

[1] It is possible that individuals may be mistakenly identifying symptoms of agitation as panic or other anxiety symptoms. Although agitation and anxiety share features of heightened physiological arousal and mental preoccupation, the states are distinct. Whereas anxiety is characterized by future-oriented cognitions that function to prepare an individual to avoid or cope with an anticipated negative event (Barlow, 2000), symptoms of agitation are typically more focused on immediate experience of physical and psychological unrest.

When considered further through the perspective of the interpersonal theory of suicide, acute states of heightened arousal, like acute agitation, may be relevant to suicidal behavior particularly when considered in the context of the acquired capability for suicide. For most individuals, the prospect of engaging in potentially lethal suicidal behavior in the close future will naturally elicit some degree of arousal. Among individuals who possess the requisite levels of pain tolerance and fearlessness about pain, injury, and death (i.e., individuals high on acquired capability), the heightened state of arousal experienced during periods of acute agitation may serve to facilitate suicidal behavior in part because it would provide the necessary energy to approach a potentially lethal stimulus. Among individuals who are low on acquired capability, the arousal experienced during agitation may result in further avoidance. This prediction would be in line with previous theories of the effects of increased arousal on behavior. A robust literature exists supporting the notion that states of heightened arousal lead individuals to react with their most dominant response or the response that is most familiar or commonly elicited (e.g., dominant response theory; Hull, 1943; Zajonc, 1965). For individuals who are low on acquired capability, the response when faced with a potentially lethal means for suicide will be avoidance; for individuals who are high on acquired capability, avoidance is less likely to be the dominant response.

Alternate views may also be used to conceptualize the function of agitation in suicidal behavior. Some theories may suggest that agitation, which might arise for a variety of reasons, is so distressing that the experience of it will result in using suicide as a means of resolving or escaping the distress. This view, for instance, would be consistent with the views advanced in Psychache Theory (Shneidman, 1993, 1999) as well as in Escape Theory (Baumeister, 1990). The interpersonal theory perspective suggests agitation is not the cause of suicidality[2] but instead a byproduct of the daunting nature of the prospect of engaging in potentially lethal suicidal behavior. Although the aversive nature of agitation may serve to increase an individual's distress, it alone is not sufficient in predicting suicidal behavior in the absence of requisite levels of the capability for suicide. Should the alternate view (i.e., suicide as a means of escaping aversive state of agitation) hold true, we would expect that arousal alone would result in increased suicidality. The interpersonal theory suggests that heightened states of arousal will only result in lethal or near-lethal suicidal behavior among

[2] For the purposes of the present project, the term "suicidality" is used to describe a subset of suicidal symptoms, including suicidal thoughts, urges, and plans, that increase risk of death by suicide.

suicidal individuals who are high on acquired capability for suicide – among those who lack the requisite levels of fearlessness about pain, injury and death and/or pain tolerance, arousal will likely serve to deter them from engaging in suicidal behavior as increased arousal might serve to increase avoidance of potentially lethal suicidal behavior. Of note, although there is an existing literature supporting a direct relationship between agitation and suicidal behavior, it is important to note that the majority of research on the role of agitation on suicidal behavior to date has been conducted with samples of participants who have died by suicide or suffered a suicide attempt. Past suicidal behavior is a strong risk factor for developing the acquired capability; as such, samples used in existing research were likely comprised of individuals who had heightened levels of acquired capability for suicide. In samples enriched with respect to the acquired capability (such as those used in past research), a main effect of arousal on suicidal behavior would be expected within the context of the interpersonal theory of suicide perspective.

In the present project, we examine the hypothesis that agitation may interact with the acquired capability for suicide to predict greater suicide risk in a large military sample of Army recruiters. Further, we believe the effects of this statistical interaction will extend beyond those of other factors known to be associated with suicidal ideation. We expect that elevated levels of agitation will be particularly dangerous for individuals who evidence high levels of acquired capability for suicide. For most individuals, the prospect of impending suicide will elicit some level of increased arousal (one form of which may be agitation). The heightened state of arousal may provide individuals high on acquired capability the energy and arousal necessary to engage in suicidal behavior; however, for individuals who evidence low levels of acquired capability, the increased arousal associated with agitation will not significantly increase risk and may, in fact, be associated with significantly less risk of engaging in suicidal behavior (see Anestis et al, 2011 for a compatible account).

Method

Participants and Setting

Participants included in the study were new Soldiers attending the Army Recruiting Course at The Recruiting and Retention School (RRS) at Fort Jackson, South Carolina. As an occupation, recruiting duty is a demanding one and some recent figures indicate that Army recruiters are a group within the military that may be particularly vulnerable to suicide. Recruiters play an integral role in the Army's recruiting mission as they

function primarily to disseminate information about personal and professional experiences in the Army to individuals interested in joining the Army. Typically, recruiters represent a unique group of individuals identified as exceptional and dedicated Soldiers who have performed well during their service. Meeting mission requirements of working with a volunteer to commit and follow through with joining the Army is difficult. Many recruiters experience a loss of confidence and may find the failure to meet the demands demoralizing. Moreover, recruiters are often also physically and socially isolated, with most being located a considerable distance from military installations. These challenges unique to recruiting are in addition to those typically experienced by most Soldiers, such as post-combat adjustment.

All new Army recruiters are required to complete a number of surveys and assessments during the recruiting course orientation. The assessments administered as part of this study were added to the original orientation protocol. The inclusion criterion used for the study was as follows: Soldiers attending the RRS at Fort Jackson, at least eighteen years of age, able to speak English, and capable of completing the informed consent process. All participants were provided informed consent prior to participation. No compensation was given for participation.

The sample consisted of 1,208 Army recruiters. As expected the sample was predominantly male (91.7%). Although the over-representation of males in this sample may raise some concerns about the generalizability of findings, use of a predominantly male sample squares well with the fact that males are at significantly higher risk of death by suicide. The ethnic/racial composition of the participants reflected the level of diversity commonly seen in the United States military. In our sample the breakdown was as follows: 66.0% Caucasian, 14.1% Black/African American, 12.9% Hispanic/Latino, 2.2 % Asian, 1.6% Native Hawaiian or Other Pacific Islander, 1.2% American Indian/Alaskan Native and 1.7% chose not to respond. About 12% of the participants identified as single and never married, 1.2% identified as engaged, 77.4% as married, 7.6% as divorced, and 1.4% chose not to respond. Ages ranged from 21 to 57 with a mean of 30.00 (standard deviation = 4.93). It is also of note that the age range and mean age of the sample are higher than many other military samples. Although historically the middle-aged age group has received relatively less attention for its suicide risk, recent trends in suicide rates suggest that rates of suicide are on the rise for middle-aged adults, particularly

middle-aged men (Hu, Wilcox, Wissow, & Baker, 2008). Inclusion of both young and middle-aged adults in the present sample is likely to be an advantage in this study as both age groups are at elevated risk of suicide.

Measures

Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008). A short version of the ACSS that is comprised of four items designed to measure the degree to which an individual reports habituation to both the fear of death and physiological pain was used in this study. Respondents are asked to rate statements measuring a sense of fearlessness (e.g. "I am not afraid to die") and pain tolerance (e.g. "I can tolerate more pain than most people") on a 5-point likert scale. Total scores can range from 0 – 16 with higher scores indicating higher pain tolerance as well as high fearlessness. Past research supports the construct validity and internal consistency of both the full and short versions of the ACSS (e.g., Van Orden et al., 2008; Bender et al., 2011). The alpha coefficient for the ACSS in this study was .77, indicating adequate internal consistency. The ACSS will be used as a predictor variable in the main analysis of this paper.

Brief Agitation Measure (BAM; Ribeiro, Bender, Selby, Hames & Joiner, 2011). The BAM is a 3-item self-report scale designed to measure agitation. Respondents are asked to assess how true statements of agitation (e.g., "Recently, I feel so stirred up inside I want to scream") are to them on a 7-point likert scale. Total scores can range from 3 – 21 with higher scores associated with higher levels of agitation. A study by Ribeiro and colleagues (2011) provided support for the BAM as having both internal consistency and strong preliminary validity. In the present study, the internal consistency of the scale was adequate with an alpha coefficient of .84, quite satisfactory for a three-item scale. BAM total score will be entered as a predictor variable in the main analyses of this project.

Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012). An abbreviated version of the INQ was used in the present study. The INQ is comprised of two independent subscales designed to assess the two interpersonal states (i.e., thwarted belongingness and perceived burdensomeness) thought to contribute to suicidal desire, according to the interpersonal theory of suicide. The INQ-Thwarted Belongingness subscale uses four self-report items designed to measure the extent to which an individual feels he or she lacks meaningful interpersonal connections in his or her life. Participants are asked to assess how true belongingness statements (e.g., "These days, I am close to other people") are to them on a 7-point likert scale. Range of total

scores is 4 – 28 with higher scores corresponding to greater thwarted belongingness. The INQ-Perceived Burdensomeness is a four-item self-report subscale designed to measure the severity of perceived burdensomeness. Participants are asked to assess how true statements such as "These days I feel like a burden on the people in my life" are to them on a 7-point likert scale. The INQ and both its constituent subscales have demonstrated sound psychometric properties consistently in past work (e.g., Van Orden et al., 2008; Van Orden et al., 2006). In this study, the internal consistency of both subscales was strong with coefficient alphas of .90 and .86 for the INQ-Thwarted Belongingness and INQ-Perceived Burdensomeness respectively. The correlation between the scales in this sample was low-to-moderate (.34, $p < .05$), which is in line with past research using the full version of the INQ that indicates that the scales are correlated but not redundant (e.g., Van Orden et al., 2012). Both subscales will be entered into the analyses as covariates.[3]

Suicide Cognitions Scale (SCS; Rudd et al., 2008). The version of the SCS used here consists of ten self-report questions devised to measure suicide-specific hopelessness including helplessness, unlovability and poor distress tolerance. The SCS requires participants to rate statements such as "Nothing can help solve my problems" on a 5-point likert scale. Scores range from 10 – 50 with higher scores signifying higher levels of suicide-specific hopelessness. Past research using the SCS provides some evidence for the scale's sound psychometric properties, including strong internal consistency and construct validity (e.g., Jahn, Cukrowicz, Linton, & Prabhu, 2011; Slee, van der Leeden, Arensman, & Spinhoven, 2008; Slee, Garnefski, Spinhoven, & Arensman, 2008). The alpha coefficient for the SCS in the present sample was .82, indicating adequate internal consistency. SCS total score will be entered as a covariate in our analyses. It is worth noting that the content of several SCS items directly references suicide, and therefore is conflated, at least to a degree, with most suicidal outcome variables, including the DSI-SS. Therefore, the SCS in the present study represents a particularly stringent covariate for our analyses.

Depressive Symptoms Index – Suicidality Subscale (DSI-SS; Metalsky & Joiner, 1997). The DSI-SS is a 4-item self-report scale designed to assess the degree and severity of suicidal thoughts as well as plans

[3] Analyses testing specific aspects of the interpersonal theory of suicide are possible with these data; however, those analyses go beyond the scope of the current project, the intention of which is to examine the unique contribution of the interaction between agitation and acquired capability to suicide risk, beyond the effects of stringent covariates. All findings reported here remain when interpersonal theory variables and interactions are controlled.

and impulses for suicidal behavior. For each question, participants are asked to respond using a four-point likert scale with total scores ranging from 0 – 12. Higher scores on the DSI-SS indicate greater severity of suicidality. DSI-SS total scores will serve as the main outcome measure in the current analyses. The DSI-SS has been shown to have strong psychometric properties as a measure of suicidality (Joiner et al., 2002; Ribeiro, Braithwaite, Pfaff, & Joiner, 2012). In the present study, the DSI-SS had an alpha coefficient of .60. The attenuated coefficient alpha in this sample is worth discussing, given the DSI-SS has repeatedly demonstrated strong internal consistency (e.g., Joiner et al., 2002; Ribeiro et al., 2012; Pfaff, Almeida, Witte, Waesche, & Joiner, 2006). Given the sample, the lower alpha of the present project may be influenced by Soldiers potentially withholding information about the extent or severity of suicidal symptoms on some DSI-SS items[4]. Importantly, the fact of somewhat low reliability should make effects harder not easier to detect, and as reported next, predicted effects emerged.

Results

Preliminary Analyses. Means, standard deviations, and intercorrelations for the variables used in these analyses are presented in Table 1. As expected, perceived burdensomeness, thwarted belongingness, agitation, and suicidal cognitions were all significantly associated with each other as well as DSI-SS suicidality scores. The strongest association with the DSI-SS was with suicidal cognitions as measured by the SCS, which was in the moderate-to-strong range ($r = .51$, $p<.001$). This is not surprising given the content of the items included in the SCS, which includes direct references to suicidal thoughts. All other associations fell in the low-to-moderate range. As is consistent with the interpersonal theory, acquired capability (as measured by the ACSS) failed to demonstrate a significant zero-order correlation with DSI-SS scores (and only evidenced a very modest association when entered as a main effect into the regression model; see Table 2). This finding is in line with the interpersonal theory of suicide because, according to the theory, the acquired capability for suicide is distinct from suicidal ideation and should only be predictive of suicidal behavior when experienced in conjunction with suicidal desire. As such, we would expect very modest (if any) associations with outcomes

[4] Consistent with the possibility of under-report, analyses examining response frequency and item-level correlations of the DSI-SS items indicated that endorsement of Item 2 was rare and its associations with the other items of the DSI-SS were all very modest or non-significant. Item 2 of the DSI-SS directly assesses the development of a plan for suicide, which may conceivably result in more intensive intervention if endorsed as compared to the intervention that might be indicated by endorsing suicidal ideation or ability to control suicidal urges in the absence of a plan for suicide. Alpha increased to close to .70 when it was recalculated for the items of the DSI-SS omitting Item 2.

related to suicidality, just as we found here. Scores on the DSI-SS are also of note. The mean and standard deviation of the scale were lower than what has been documented in past research. Although this may well be accurate given that recruiters are selected because of their relatively high functioning, it is also possible that this is an indication of under-reporting.

Acquired Capability, Agitation, and Their Interaction as Predictors of Suicidality. Hierarchical multiple regression was used to examine the effect of the interaction between agitation and acquired capability for suicide on suicidality, controlling for the effects of thwarted belongingness, perceived burdensomeness, and suicidal cognitions. In the first step, SCS scores as well as scores on the thwarted belongingness and perceived burdensomeness subscales of the INQ were entered. Agitation (BAM total scores) and acquired capability (ACSS total scores) were entered into the analysis as predictors in the second step, and the interaction between ACSS and BAM scores was entered in the third. Results indicated that the model as a whole was significant ($F[6, 1201] = 78.23$, $p<.001$), explaining 27.7% of the variance in DSI-SS suicidality scores. As expected, the influence of the covariates was strong accounting for a significant proportion of the variance in DSI-SS in the first step of the model. In the second step, acquired capability evidenced a significant main effect ($\beta=.005$, $p=.04$, partial $r=.07$), which, in line with the interpersonal theory's proposition, was modest in magnitude. Also consistent with the perspective of the interpersonal theory of suicide (and in contrast to alternative perspectives discussed above), the main effect of arousal failed to evidence a significant main effect on DSI-SS scores ($\beta=-.001$, $p=.66$). With respect to the joint influence of agitation and acquired capability, results were also in line with our a priori hypotheses: the statistical interaction of agitation and acquired capability remained significant, even after accounting for the main effects of BAM and ACSS scores as well as the effects of INQ-Perceived Burdensomeness, INQ-Thwarted Belongingness and SCS scores ($\beta=.003$, $p<.001$, partial $r=.13$). The interaction accounted for 1.1% beyond the main effects of acquired capability and agitation as well as the effects of suicidal cognitions, belongingness and perceived burdensomeness, which accounted for 26.6% of the variance (see Table 2 and Figure 1).

To interpret this interaction, we assessed the simple effect of agitation among individuals high (1 SD above the mean) and low (1 SD below the mean) in acquired capability ($M=9.53$, $SD=3.28$). As anticipated, among individuals high on acquired capability, as agitation increased, suicidality also increased ($\beta=.009$, $p=.02$,

partial r=.14). Among individuals low on acquired capability, as agitation increases, DSI-SS scores decrease, when controlling for belongingness, perceived burdensomeness, and suicidal cognitions (β=-.012, p=.002, partial r=.13).

Discussion

The interpersonal theory of suicide suggests that most individuals who develop suicidal desire will not die by suicide because of the difficulties inherent in engaging in suicidal behavior. Because lethal suicidal behavior is innately fearsome and often physically painful, in order to engage in suicidal behavior individuals must also develop the capability to do so. Nevertheless, confronting any potential threat to survival will result in increased arousal. Converging evidence indicates acute states of heightened arousal are commonly observed in the short time period preceding deaths by suicide – this would be consistent with the proposition that suicidal behavior is daunting and requires energy. The guiding hypothesis of the present work was that heightened states of arousal would serve to facilitate suicidal behavior, particularly among individuals who are high on acquired capability. The present project was designed to test this hypothesis. Results were in line with a priori hypotheses.

As expected, suicide risk increased as a function of the interaction between acute agitation and acquired capability, such that risk was highest among individuals who were both high in self-reported acquired capability and agitation. Importantly, in light of our conceptualization, for individuals endorsing low levels of acquired capability, increasing levels of agitation were associated with lower suicide risk as measured by the DSI-SS. The effect of the statistical interaction between agitation and acquired capability held beyond the main effects of agitation and acquired capability as well as the effects of strong covariates associated with suicidal desire – namely, thwarted belongingness, perceived burdensomeness, and suicidal cognitions.

Prior to discussing the implications of these findings on research and practice, several limitations are worth noting. One limitation of the present project is that our assessments were limited to self-report and therefore subject to self-report biases. This may be particularly relevant for certain populations where stigma about mental health is well-documented, such as within the military (Kim et al., 2011; McFarling et al., 2011). In the present sample, for instance, the attenuated mean, standard deviation, and coefficient alpha associated with the DSI-SS may be indicative of biased self-report. Multiple methods of measurement, such as behavioral

or clinical interview assessments coupled with self-report, would be ideal in future studies. Relatedly, the outcome measure used to index suicide risk can be improved. For the present project, we used an index of suicidality that includes questions about current suicidal thoughts, plans, and urges to act. As our argument holds that acquired capability and agitation may function to increase the likelihood of suicidal behavior, examining the influence of the relationship on suicidal behavior (e.g., preparations, attempts, death) per se would be optimal. Further, the findings from the present research are cross-sectional, precluding any causal inferences. Prospective and experimental study designs may clarify the direction of causality of the relationship between suicide risk, acute agitation, and acquired capability. Lastly, because the sample is predominantly male and drawn from a military population, it is unclear whether findings will generalize outside of the present sample. Studies designed to replicate these findings in samples that are more representative of the general population are necessary. It should be noted, however, that there are several advantages of this sample. In particular, it is enriched with respect to several salient risk factors (i.e., military background, predominantly male, not exclusive to young adults). Using an enriched sample such as the one of the present paper often increases the likelihood of identifying findings relevant to high risk populations that share similar risk factors for death by suicide.

The present study adds to and extends the existing empirical literature base documenting a link between agitation and suicide. Although the link was well-documented, theoretical explanations that offered strong explanations for why the link exists are limited. The present project was designed to address this gap in the literature, offering evidence in support of a novel perspective that extends the propositions of the interpersonal theory of suicide. In addition to adding to the construct validity evidence of the link between agitation and suicide, it further clarifies the nature of that link by offering evidence for the moderating role of acquired capability. Beyond further clarifying the role agitation may play in suicide, the current study also adds to the construct validity of the acquired capability for suicide as well as the theory's proposition that suicidal behavior is difficult and requires energy to enact.

At first blush, finding that the interaction between acquired capability and agitation significantly predicts an outcome measure mostly composed of items assessing suicidal thoughts may seem inconsistent with the main tenets of the interpersonal theory of suicide, as the theory would hold that acquired capability should only

be associated with outcomes of suicidal ideation when in the presence of the risk factors for suicidal desire – perceived burdensomeness and thwarted belongingness. In the present paper, we controlled for the influence of variables thought to contribute to suicidal ideation and found evidence that the interaction of acquired capability and agitation explained a significant amount of variance in the outcome. It is important to note, however, that the items that comprise the DSI-SS not only assess ideation but suicidal plans as well. Previous research has repeatedly demonstrated that suicide risk can be differentiated into two separable underlying factors – suicidal desire/ideation and resolved plans/preparation (Joiner et al., 1997; Witte et al., 2006). Resolved plans and preparation is defined in part by an elevated intent to engage in suicidal behavior (Joiner et al., 1997) and shown to be predictive of later death by suicide (Harriss, Hawton, & Zahl, 2005). According to Van Orden and colleagues (2010), individuals who evidence suicidal intent must have habituated to the fear involved in suicide to the degree necessary to formulate a plan and engage in suicidal behaviors. As DSI-SS total scores incorporate both desire and planning aspects jointly, the relation with outcomes on the DSI-SS and ACSS scores particularly when considered in the context of arousal is certainly possible and consistent with the tenets of the theory. Moreover, there has also been some evidence to suggest that mental rehearsal of suicidal thoughts may contribute to the acquired capability for suicide (Selby, Anestis, & Joiner, 2007); however, as we did not assess for level of mental rehearsal in the present study, it remains a question open for further empirical study.

Further, although alternative perspectives may suggest that suicidal behavior is used to escape agitation, our findings do not support this conceptualization. In the event that risk of suicide were to increase as a function of increasing agitation alone, we would expect the main effect of agitation to be significant beyond the effects of the other predictors in the model, which was not the case in the present study. Instead, the effect is moderated by level of acquired capability for suicide such that agitation is most dangerous for individuals high on the acquired capability for suicide. It is also notable that a significant effect was observed for individuals low on acquired capability such that increased arousal was associated with significantly less suicidality. This effect is highly consistent with the interpersonal theory of suicide's conceptualization of the agitation-suicide link but difficult to account for using theories that suggest that individuals engage in suicidal behavior to escape the distress associated with agitation.

With respect to implications for clinical work, our findings indicate that agitation may be an important target for risk assessment. Beyond having a clear link to suicide, agitation has limited face validity with respect to its suicide risk. Because of this, it may be a particularly informative assessment target, especially among high-risk individuals who may be unable or unwilling to disclose information about suicidal ideation or intent. Several studies have reported that many suicide decedents fail to directly communicate suicidal intent in the days and weeks preceding their deaths (Isometsä, Heikkinen, Marttunen, & Henriksson, 1995), even when directly questioned about suicidal symptoms (Busch & Fawcett, 2004; Busch et al., 2003). In settings where stigma about mental health symptoms is common, incorporating the assessment of risk factors with limited face validity, such as agitation, may be useful. One such setting is within the military, for instance, where stigma about mental health is well-documented (Kim et al., 2011) and acquired capability is likely high, given that combat exposure has been shown to confer risk for its development (Bryan et al., 2010).

The findings of the present research have important implications for treatment planning as well. According to our results, agitation may be particularly dangerous among individuals who are high on the acquired capability for suicide. Based on the interpersonal theory's conceptualization, treating or reducing an individual's level of acquired capability for suicide may be difficult and time-intensive, as it would require reversing an individual's learned associations about pain, injury, and death (Van Orden et al., 2010). Acute agitation, by contrast, is time-limited and modifiable (Fawcett et al., 1990). Therefore, should agitation arise, particularly among individuals who likely are higher on acquired capability, it may be prudent to prioritize the treatment of the acute agitation. When agitation is severe, pharmacological interventions are indicated, including time-limited use of benzodiazepines, atypical antipsychotics, or their combination (Battaglia, 2005). Non-pharmacological techniques, like increased and intensive activity (e.g., exercise) followed by a relaxing activity or an activity that is not over-stimulating, may be useful for less extreme states of agitation; however, this has yet to be directly tested empirically. When agitation is severe or extreme, monitoring and managing the agitation in a hospital setting may be indicated in order to ensure safety.

In sum, the present research represents an initial effort evaluating the link between agitation and suicidal behavior through the lens of the interpersonal theory of suicide. The preliminary evidence gathered in the present study suggests that the combination of agitation with high levels of acquired capability may be a

particularly dangerous state with respect to suicide risk. There is a need for more research further elaborating our understanding of this association and we look forward to prospective and experimental designs that are able to further refine our understanding of the association between imminent suicide risk, agitation, and the acquired capability for suicide.

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Table 1
Means, Standard Deviations, and Inter-correlations

	1	2	3	4	5	6
1. ACSS	1.00					
2. BAM	.02	1.00				
3. INQ-Perceived Burdensomeness	-.01	.37**	1.00			
4. INQ-Thwarted Belongingness	-.07*	.34**	.36**	1.00		
5. SCS	-.03	.40**	.60**	.33**	1.00	
6. DSI-SS	.04	.22**	.38**	.23**	.51**	1.00
Mean	9.53	4.35	4.45	7.12	10.32	.03
Standard Deviation	3.28	2.50	1.78	4.38	1.50	.26

Note. ACSS = Acquired Capability for Suicide Scale; BAM = Brief Agitation Measure; INQ = Interpersonal Needs Questionnaire; SCS = Suicide Cognitions Scale.

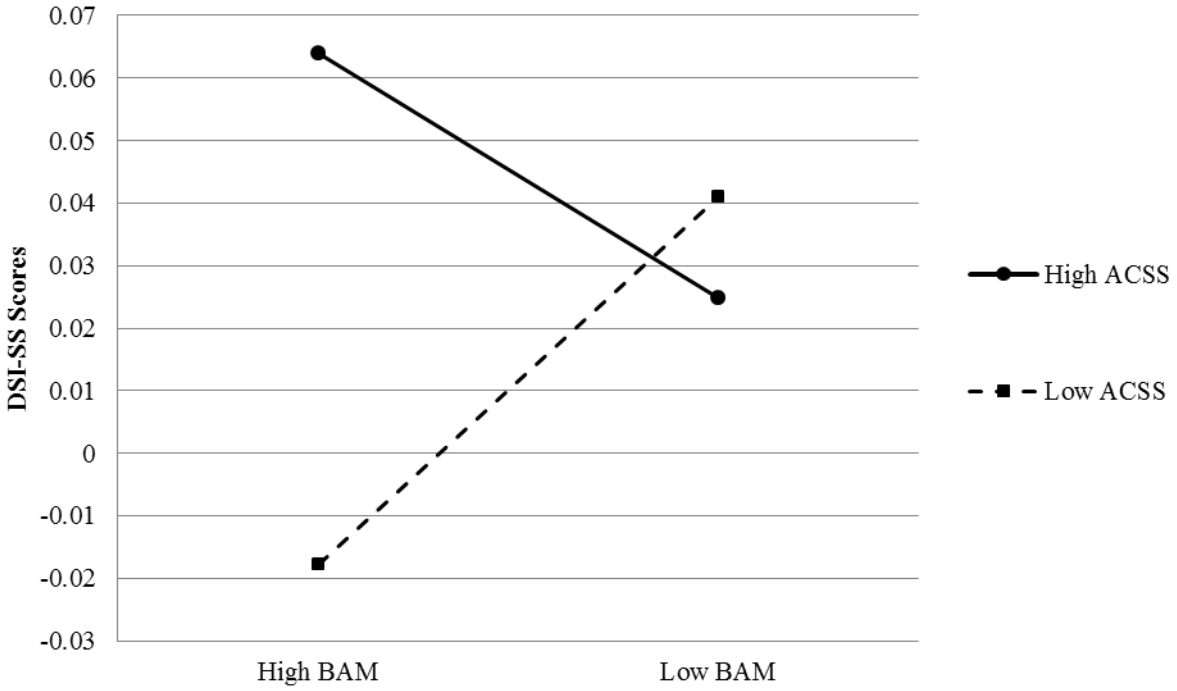
Table 2

	R^2	β	t	p
Step 1	.516			
INQ-Thwarted Belongingness		.014	3.18	.002
INQ-Perceived Burdensomeness		-.003	-1.89	.06
SCS		.073	13.75	<.001
Step 2	.519			
BAM		-.001	-.43	.66
ACSS		.005	2.40	.04
Step 3	.530			
ACSS X BAM		.003	4.36	<.001

Note. ACSS = Acquired Capability for Suicide Scale; BAM = Brief Agitation Measure; INQ = Interpersonal Needs Questionnaire; SCS = Suicide Cognitions Scale.

Figure 1

Interaction of BAM and ACSS scores predicting DSI-SS scores, Controlling for INQ-Thwarted Belongingness, INQ-Perceived Burdensomeness, and SCS scores



Note. ACSS = Acquired Capability for Suicide Scale; BAM = Brief Agitation Measure; INQ = Interpersonal Needs Questionnaire; SCS = Suicide Cognitions Scale.

Evaluating the Interpersonal Theory of Suicidal Behavior in an Active Duty Military Sample

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Abstract

Suicidal behavior is a major concern for US Military personnel and veterans. It is a top priority to ensure that service members who experience suicidal are identified and treated efficiently and effectively. One potential way to improve our current understanding of suicidality in the military is by examining the facets of the Interpersonal Theory of Suicide (IPT; Joiner, 2005) in military populations. Doing so may improve our assessment methods as well as facilitate our ability to treat military populations and veterans with increased risk for suicidal behavior. The current study aimed to evaluate the three facets of the IPT (i.e. perceived burdensomeness, thwarted belongingness, and the acquired capability for suicidal behavior), and their interactions in an active duty sample of military recruiters (N=1208). Using data obtained during a brief screening administered during Army recruiter training, this study found evidence to support the role of all three IPT constructs in increased suicidal ideation. Furthermore, evidence for interactions between the facets of IPT was obtained, with trending evidence supporting a three-way interaction between the variables such that elevations in all three predicted the highest levels of suicidal ideation. Assessment and treatment implications using these measures are discussed, as are the theoretical implications of IPT on suicidality in the military.

Introduction

Suicide is the second most common cause of death in the United States Armed Forces, with rates of between 9 and 15 deaths by suicide per 100,000 people (Ritchie, Keppler, & Rothberg, 2003; U.S. Department of Defense, 2007). In recent years the suicide rates of military personnel and veterans have increased (Kang & Bullman, 2008; Lorge, 2008). The suicide rate for United States military personnel who have seen combat is particularly high (Kang & Bullman, 2008), with rates surpassing the suicide rate of the general population. This alarming trend suggests that military service may contribute in unique and challenging ways to later death by suicide. Given these issues, and the high priority of ensuring the psychological well-being of our armed forces and veterans, further research on the factors that influence suicidal behavior in the military is needed.

One way to conceptualize and investigate suicidal behavior in the military is through the use of the Interpersonal Theory of Suicide (IPT; Joiner, 2005; Van Orden et al., 2010). The IPT delineates a theory of suicidal behavior that focuses on three necessary, jointly sufficient variables that must be present for an individual to make a lethal suicide attempt: thwarted belongingness, perceived burdensomeness, and the acquired capability for suicide. These three constructs can be used to determine not only who desires to die by suicide, but also who is most capable of engaging in lethal suicidal behavior when suicidal ideation is present. This determination is important because there is evidence that although approximately 15% of the U.S. population seriously considers suicide at some point in the course of their life (Nock et al., 2008a), only 1.4% of the population engages in suicidal behavior (Nock et al., 2008b).

In the IPT, suicidal ideation is thought to arise when individuals experience simultaneously both thwarted belongingness and perceived burdensomeness. Thwarted belongingness, as conceptualized in the IPT, is defined as an unmet need to belong that involves a lack of frequent, positive social interactions, and feelings of not being cared about by others (Baumeister & Leary, 1995). The "thwarted" aspect of belongingness indicates that, although some individuals may make efforts to belong as part of a group, there may be barriers that are preventing them from successfully doing so. This could involve lack of compatible interests with others, lack of opportunity for meeting others, or psychological interferences for connecting with others (e.g., social anxiety). Thwarted belongingness is applicable to individuals who genuinely lack social support networks, as well as individuals who have contact with family and friends but feel that they are not genuinely connected to them. Thwarted belongingness has been found to be associated with suicidal ideation in military samples (Bryan, 2011). It has also been found to be a common theme in suicide notes left by military personal who died by suicide (Cox et al., 2011).

The second component of suicidal ideation in IPT is perceived burdensomeness. This domain consists of misperceptions of the individual that he or she is a burden to others around him/her, failing not only to make meaningful contributions to society, but also serving as a liability to others. Essentially, individuals feeling increased perceived burdensomeness view their existence as harming others, and that others would be better off without them, making their death worth more to others than their life. It is important to note the "perceived" component of burdensomeness, as those who believe they are a burden may feel this way despite evidence to the contrary or when society might view such individuals as contributing a great deal. Perceived burdensomeness has been linked to suicidal ideation and suicide attempts in various clinical samples (Van Orden et al., 2008; Joiner et al., 2009).

Furthermore, perceived burdensomeness has also been linked to suicidal ideation in military personnel in multiples studies (Byran, 2011; Bryan, Morrow, Anestis, & Joiner, 2010; Bryan, Clemans, & Hernandez, 2012).

The final component of IPT is the acquired capability for suicide (referred to simply as the acquired capability from hereon). Although perceived burdensomeness and thwarted belongingness experienced simultaneously and experienced as unchangeable may explain *why* some people develop suicidal ideation (Van Orden et al., 2010), the IPT implies that the presence of acquired capability explains why only some people are prepared to enact serious plans for death by suicide. Acquired capability involves an individual's ability to withstand the fear of death and experience of pain – factors that deter most people from serious self-harm. The theory suggests that acquired capability develops over time through exposure to painful and provocative events such as physical abuse, accidental injuries, self-injurious behavior without suicidal intent, and importantly for military populations and veterans, combat exposure (Joiner, 2005; Selby et al., 2010; Van Orden et al., 2010). Particularly relevant to the military, the following factors are likely to facilitate the development of acquired capability and all are associated with greater risk of suicidal behavior in military populations: multiple combat deployments (Kang & Bullman, 2008), longer deployments (Adams et al., 1998), and combat injury (Bullman & Kang, 1996). Recent findings suggest that in general, combat experience in the military is associated with increased acquired capability (Bryan, Cukrowicz, West, & Morrow, 2010). Another study found that the experience of violent combat experiences with high injury rates was associated with increased levels of acquired capability in a sample of deployed active duty combatants (Bryan & Cukrowicz, 2011). Furthermore, there is evidence that the re-experiencing symptoms of PTSD in veterans may also increase acquired capability, subsequently increasing suicide risk (Bryan & Anestis, 2011). Finally, there is also evidence that suicide attempts are on average more lethal (e.g. requiring more medical attention) in military personnel than the general population, primarily due to use of more lethal means (Anestis & Bryan, 2012).

Selby and colleagues (2010) recently extended IPT theory to the understanding of suicidal behavior in the military, attempting to highlight the specific issues of military service that may elevate risk for suicidal behavior. In this model, military experience may increase suicidal behavior primarily due to the painful and provocative situations resulting from combat, combat training, and other rigors of military experience, which may increase acquired capability and enhance one's ability to inflict lethal self-injury. These same experiences may also result in feelings of thwarted belongingness and increased feelings of being a burden on others, particularly in the transition to civilian life. When all three of these components are present, a service member's suicide risk is likely to be high (Selby et al., 2010).

Although only a few studies have examined the extension of IPT to military samples, those that have done so have indicated some support for the model. One study examined IPT factors in active duty Air Force personnel relative to a non-military undergraduate sample (Bryan, Morrow, Anestis, & Joiner, 2010). The findings of this study suggested that military personnel demonstrated a significantly higher level of acquired capability than the students, and the authors identified an interaction between perceived burdensomeness and acquired capability predicting an increased history of suicidal behavior. Another study examined two clinical samples of military personnel who were deployed to Iraq, with one sample involving patients seeking treatment for mild

traumatic brain injuries and the other sample involving an outpatient mental health sample (Bryan, Clemans, & Hernandez, 2012). The findings of this study indicated that the experience of perceived burdensomeness and elevated acquired capability predicted increased suicidal ideation and behavior in both samples. However, this study did not find a significant three-way interaction between perceived burdensomeness, thwarted belongingness, and acquired capability in predicting suicidal behavior. This study did find, however, that there was a significant interaction between perceived burdensomeness and acquired capability in predicting suicidal behavior. Finally, a scale that was designed to measure elevated levels of all three IPT variables was found to have a stronger positive associations with death by suicide in military personnel than in a living military sample (Nademin et al., 2008), providing some of the strongest support for the IPT in in predicting suicidal behavior in military samples.

Overall, studies have provided some evidence in support of the IPT in military suicide, but there are also mixed findings that are somewhat inconsistent with the IPT. Thus, additional work is needed to further examine the IPT model in military populations. Particularly, further exploration of each of the IPT variables in active duty military samples is needed to further substantiate their association with suicidality. Evaluating the associations between the facets of IPT in suicidality in the military may improve our ability to assess military personnel as well as improve our treatment approaches for those service members identified as having elevated risk for suicidal behavior. Second, further testing of the three components in IPT interacting to predict suicidal ideation and behavior is needed. Identification of interactions between the IPT facets can provide even further refined information on the role of the variables in potentially identifying suicide risk. The purpose of the current study was to examine the relevance of the IPT in an active duty military sample. We aimed to test three primary hypotheses: 1) there would be main effects for thwarted belongingness, perceived burdensomeness, and acquired capability in the prediction of increased suicidality, 2) there would be three two-way interactions between these variables such that elevations in both variables would synergistically predict increased suicidality, and 3) that there would be a three-way interaction between these variables that predicted the highest levels of suicidality.

Method

We collected data during the Army Recruiters Course conducted at the Army Recruiting and Retention School in Fort Jackson, South Carolina. The course trains those who will be responsible for recruiting new recruits into the Army. Approximately 30-50 new recruiters attend this class per week (except for two weeks) each year. The present study involves data from select measures from the baseline phase of an ongoing longitudinal project (the follow-up wave of which is expected to be completed in 2015), which includes a brief component involving suicide-related measures totaling 34 items and a five-minute implicit cognitions measure (this cognitions measure was not included in the present study). Neither individuals in the participants' chain of command nor the recruiters' course instructor were present at the time of recruitment into the study, in order to minimize tacit or implicit coercion. All participants completed informed consent and were not compensated for their participation in this study.

Participants

The total number of participants included in the sample was 1,208. To describe the overall demographic coverage, 66.1% identified as "White or Caucasian", 14.2% identified as "Black or African American", 12.9% identified as "Hispanic or Latino", 2.2%

identified as “Asian”, 1.6% identified as “Native Hawaiian or Other Pacific Islander”, 1.2% of participants identified as “American Indian or Alaskan Native”, and 1.7% did not respond. These figures are expected given the population the sample is drawn from and the diversity of our sample is reflective of our military generally. With regard to age, participants ranged from 21 to 57 years of age (M = 30.00, SD = 4.93). With regard to sex, 91.7% of participants identified as “Male” and 8.3% identified as “Female.” With regard to marital status, 77.4% identified as “Married,” 12.1% of participants identified as “Single” (never married), 7.6% identified as “Divorced,” 1.2% identified as “Engaged,” .3% had unknown relationship status, and 1.4% did not respond.

Measures

Acquired Capability for Suicide. Acquired capability for suicide was measured by a shortened version of the Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008), which consisted of four items measuring the degree to which a participant reports habituation to both physiological pain and the fear of death on a 5-point scale (0 = *not at all like me*, 4 = *very much like me*, sample item: “I am not at all afraid to die”). Total scores on this measure were used as a predictor variable in the present study’s main analyses, with higher total scores indicating greater acquired capability. Previous research has provided evidence of the construct validity and internal consistency of both full and short versions of the ACSS (see Van Orden et al., 2008; Bender et al., 2011; Smith et al., 2011). With regard to internal consistency, Cronbach’s alpha in previous samples was .83 (Bender et al., 2011) and .88 (Smith et al., 2010) for the 20-item version, and .67 for the 5-item version (Van Orden et al., 2008). In the present sample, Cronbach’s alpha was .77, which indicates adequate internal consistency.

Thwarted Belongingness and Perceived Burdensomeness. A shortened adaptation of the Interpersonal Needs Questionnaire (INQ; Van Orden, Cukrowicz, Witte, & Joiner, 2012) was used to measure thwarted belongingness and perceived burdensomeness. The scale is comprised of two independent subscales measuring each construct respectively. In the shortened version of the INQ used in the present study, each subscale consists of four items each with a 7-point response scale (1 = *Not at all true for me*, 7 = *Very true for me*). The thwarted belongingness items measure the degree to which an individual believes that he or she lacks meaningful connections with other individuals (sample item: “These days, other people care about me.”). The perceived burdensomeness items measure the degree to which an individual perceives that he or she is a liability to others and fails to make meaningful contributions to the world (sample item: “These days, I feel like a burden on the people in my life.”). Past research provides strong evidence of the measure’s construct validity (Van Orden et al., 2012). With regard to internal consistency, Cronbach’s alpha was .85 in a previous sample for the 5-item belongingness subscale and .89 for the 7-item burdensomeness subscale (Van Orden et al., 2008). In the present sample, Cronbach’s alpha was .90 for the 4-item belongingness subscale and .86 for the 4-item burdensomeness subscale, indicating high internal consistency. For both thwarted belongingness and perceived burdensomeness, higher scores corresponded to higher levels of each (belongingness items were reverse-coded to accomplish this). Total scores for each subscale were used as predictor variables in the main analyses of the present paper.

Suicidality. The Depressive Symptoms Inventory – Suicide Subscale (DSI-SS; Metalsky & Joiner, 1997) consists of four items which measure the degree and severity of suicidal thoughts, plans, and urges on a 4-point scale, with responses specific to each

item (sample response: "I always have thoughts of killing myself."). Total scores on this measure were used as the outcome variable, with higher scores indicating higher levels of suicidality. Previous research supports the construct validity of the DSI-SS as a measure of suicidality as well as its internal consistency and generalizability (e.g., Joiner et al., 2002; Ribeiro, Braithwaite, Pfaff, & Joiner, 2012). In the present sample, Cronbach's alpha was .60. Although this is low, the DSI-SS only consisted of four items, and fewer items tend to reduce internal consistency, especially when the DSI-SS measures various facets of suicidality, including thoughts, plans, impulses (Ribeiro, Braithwaite, Pfaff, & Joiner, 2012)[5].

Results

Preliminary Analyses. Means, standard deviations, and intercorrelations of all dependent and independent variables are presented in Table 1. Of note, the mean and standard deviation of the DSI-SS scores were significantly lower than what would be expected given past research (Joiner, Pfaff, & Acres, 2002), and may have been due to participants being in a novel environment that reduced some suicidal ideation, such as formulation of suicide plans. Although the attenuated values may indeed be accurate reflections of Army recruiter's relatively high functioning, the possibility of under-reporting is also worth consideration. It is important to note that under-reporting and the associated restriction of range is unlikely to increase and may well decrease the likelihood of support for our predictions.

With respect to intercorrelations, results were largely as expected. Thwarted belongingness, perceived burdensomeness, and DSI-SS suicidality scores were significantly associated with each other, with zero-order correlations in the low-to-moderate range. As suicidal ideation is conceptually distinct from the acquired capability for suicide, we expected very modest (if any) significant correlations between acquired capability for suicide scores and measures of suicidality (DSI-SS scores) or risk factors of suicidal ideation (INQ-TB, INQ-PB scores). Consistent with this expectation, ACSS scores only evidenced a very modest significant negative correlation with INQ perceived burdensomeness scores and failed to demonstrate significant zero-order correlations with the DSI-SS suicidality scores and INQ thwarted belongingness scores. This finding was expected and consistent with past work, which indicates that although one can have a high level of acquired capability, he or she may not necessarily be experiencing suicidal ideation/desire, reducing the association between these factors (Anestis et al., 2011; Bryan et al., 2010).

Acquired Capability, Thwarted Belongingness, and Perceived Burdensomeness as Predictors of Suicidality. To examine all hypotheses, including that involving the three-way interaction of acquired capability, thwarted belongingness, and perceived burdensomeness as a predictor of suicidal ideation, we used hierarchical multiple regression. Main effects of acquired capability for suicide (ACSS total scores), thwarted belongingness (INQ-TB total scores), and perceived burdensomeness (INQ-PB total scores) were entered first into the model. In step 2, all combinations of two-way interactions (i.e., ACSS*INQ-TB, ACSS*INQ-

[5] One potential reason for the low internal consistency of the DSI-SS items may involve the item on "plans" for suicidal behavior. Because suicidality was assessed at the start of recruiter training, involving a new setting and set of rules, those who were experiencing suicidal ideation may not have been able to formulate specific plans at that time. This could result in inconsistency between the suicidal ideation and planning items. Another possibility is that the plans item particularly stood out to participants as a question they should deny.

PB, INQ-TB*INQ-PB) were entered. In the final step of the model the three-way interaction (i.e., ACSS*INQ-TB*INQ-PB) was entered in the model.

As a whole, the model was significant ($F[7, 1197] = 55.20$, $p<.001$), explaining 24.5% of the variance in DSI-SS suicidality scores. Approximately 15.3% of the variance in DSI-SS suicidality scores was accounted for by the main effects entered in Step 1 of the model. As demonstrated in Table 2, when only the main effects were examined all three IPT variables significantly predicted elevated suicidality in this military sample in predicted ways. Similarly, when the three two-way interactions were entered simultaneously all three predicted increased suicidality. Graphing these interactions indicated that at higher levels of the two variables involved, suicidality increased. Inclusion of the two-way interactions at Step 2 explained an additional 9% of the variance.

When the three-way interaction (i.e., ACSS*INQ-TB*INQ-PB) was entered in the final step, the three-way interaction reached the level of non-significant trend ($p=.067$; see Table 2 and Figure 1). To interpret the three-way interaction posited by the interpersonal theory, we examined the simple effect of the two-way interaction of thwarted belongingness and perceived burdensomeness among individuals high (1 SD above the mean) and low (1 SD below the mean) in acquired capability ($M = 9.53$; $SD = 3.28$). Consistent with the interpersonal theory, among individuals high in acquired capability, there was a significant effect of the interaction of perceived burdensomeness and thwarted belongingness such that DSI-SS scores increased as a function of increasing levels of the interaction between thwarted belongingness and perceived burdensomeness scores ($\beta=.008$, $p<.001$, partial $r=.23$). A similar though slightly attenuated effect is notable among individuals low on acquired capability as well ($\beta=.006$, $p=.02$, partial $r=.19$).

Discussion

The current study investigated thwarted belongingness, perceived burdensomeness, and acquired capability for suicide in a sample of active duty military recruiters. Findings indicated that all three variables had significant positive associations with the experience of suicidality. Furthermore, there were three significant 2-way interactions between each of the key IPT variables such that, as scores on any two of these variables increased, so did suicidality scores. Finally, there was also a non-significant trend toward a three-way interaction such that the highest levels of suicidality were observed when all three IPT variables were simultaneously elevated. These findings provide further support for the role of the IPT in understanding suicidal behavior in the military, although further work is needed to support the role of a 3-way interaction in predicting suicidal behavior in military samples.

The findings of significant main effects for thwarted belongingness, perceived burdensomeness, and acquired capability on suicidality in an active duty military sample replicate previous findings in various military and veteran samples. Accordingly, work should continue to delineate the specific effects of military service on these variables. Evidence from a number of studies supports potential for military training and experience to contribute to acquired capability (Anestis & Bryan, in press; Bryan & Cukrowicz, 2011; Bryan, Morrow, Anestis, & Joiner, 2010). There are numerous ways in which military service can facilitate the development of acquired capability. The very nature of military training involves preparing service members to engage in provocative and potentially terrifying situations, and the training goal of increasing stoicism in the face of danger may inadvertently increase risk for suicidal

behavior for those who develop suicidal ideation. Similarly, actual experiences of combat may also increase suicide risk; however the nature of the relation between combat exposure and suicidality is still being refined. For example, one recent study examined suicidal behavior in two military samples and failed to find an association between combat deployment and suicide risk (Bryan, Hernandez, Allison, & Clemans, 2013), suggesting that further work is needed to determine if combat actually does increase suicide risk via increased acquired capability. Finally, experience of military training/combat injuries and PTSD symptoms are also likely to be routes through which military service may increase acquired capability.

Although the potential effect of military service on acquired capability seems rather straightforward, the role of military service on thwarted belongingness and perceived burdensomeness may be more complex. For example, Selby and colleagues (2010) note that many people in the military experience increased belongingness as well as an increased sense of purpose. These increases can be due to camaraderie developed in the military, as well as feelings that one is contributing to one's community and country. These findings are consistent with empirical evidence that active duty military members have increased feelings of belonging, relative to a comparable undergraduate sample (Bryan, Anestis, Morrow, & Joiner, 2010), for example. However, in other ways military service can increase feelings of being a burden or not belonging in a way that propagates suicidal behavior. For example, disability arising from service can result in problems in both of these areas (Hoge et al., 2005). Furthermore, if a service member is struggling with duties or struggling with fitting into military social culture, service may actually reduce feelings of belonging and increase feelings of being a burden in some members. Discharge from service, whether dishonorable or due to injury, could also cause problems with these IPT facets. Even an honorable discharge may result in a subsequent reduction in the positive aspects of military service, as veterans struggle to reintegrate into civilian life and face difficulties beginning new careers, potentially increasing feelings of burdensomeness and belongingness. In line with these notions, when the higher-order interactions were entered into the model, the only main-effect that maintained significance was thwarted belongingness. This suggests that the presence of thwarted belongingness alone may itself be a major concern for suicidality in military samples. In addition, military recruiters may have unique pressures relative to other service members. Difficulties with success in recruiting may lead to elevated feelings of burdensomeness toward the military. Furthermore, spending more time interacting with the community and less time with other military colleagues may also bolster feelings of low belongingness. More research is needed to understand not only the military's unique influence on suicidal behavior, but also the specific aspects of different military roles on suicidal ideation and behavior.

Beyond the main effects of the IPT variables identified in this study were important interactive effects between the variables to predict increased suicidality. The implications of these interactions are important, demonstrating that while having one of these potential risk factors for suicide is problematic, the simultaneous experience of one of the problems along with another may be even more so. Based on these findings, the examination of only one facet of IPT over another (e.g., assessing acquired capability and not perceived burdensomeness or thwarted belongingness) is not recommended because it may be the synergistic nature of these facets that truly increases suicide risk. The interactive effects of these variables were also evident in the context of a three-way interaction, though this effect was small and achieved a p-value between .05 and .10. Having elevations on all three variables suggested a trend

toward increasing suicidality, as depicted in Figure 1, making this three-way interaction clinically interesting and informative, even though the interaction did not reach statistical significance.

One reason that the three-way interaction may not have reached significance is that the DSI-SS is primarily a measure of suicidal ideation, and does not measure overt suicidal behavior. Accordingly, because the IPT postulates that ACSS is more crucial for suicidal behavior than suicidal ideation, the non-significant 3-way interaction may have reached threshold for significance if this sample was followed over time and assessed for actual suicidal behavior in addition to suicidal ideation. Along these lines, we also found the DSI-SS to have low internal consistency in this sample, however, this may have been due to the fact that items that comprise the DSI-SS not only assess ideation but suicidal plans as well. Suicide risk can be differentiated into two separable underlying factors – suicidal desire/ideation and resolved plans/preparation (Joiner et al., 1997; Witte et al., 2006). DSI-SS total scores incorporate both desire and planning aspects jointly, and lower levels of planning due to being in a new environment (e.g., recruiter training) may have inhibited formulation of suicide plans in those with ideation, lowering internal consistency.

Another potential reason for the trending three-way interaction not reaching significance may be that there was some restriction of range on the ACSS. It is likely that this sample has higher elevations of ACSS than the general population, as has been previously documented (Bryan, Cukrowicz, West, & Morrow, 2010), and if we were to include those in the military who had not already undergone combat training more range on this variable may have been obtained.

This study has multiple strengths. First, the sample is large and includes a highly heterogeneous subpopulation of the military, as recruiters come from all different areas of previous military training. Second, this study is one of only a few studies to date that examine all three IPT variables in a military population. Finally, this sample replicates previous studies that have linked IPT variables in military samples, and extends those findings to an active duty sample with identification of critical interactions between these variables. The primary limitation with the current study, however, is that the findings are cross-sectional. Because there were no longitudinal assessments of this group the role of causality of the IPT variables in preceding the onset of or causing suicidal ideation cannot be supported with these data. Future studies should examine if there are elevated levels in the three IPT variables in participants who later go on to engage in suicidal behavior. A second limitation with the current study is that only self-report measures were used. Some studies have indicated that some participants hide or minimize the presence of suicidal ideation during routine assessments, making the need for assessments that detect suicide risk regardless of interference from the individual being assessed (Nock et al., 2010). A final limitation to this study was that we were unable to examine in detail the various ways in which military training and experience can contribute to the development of IPT variables. Different experiences with various types of military training and combat may have differing effects on these variables, with some roles in the military being more relevant to the facets of IPT than others. Future work should continue to refine the specific ways in which military service influences each of these variables, for better or worse.

There are some important clinical implications of the current study. Previous studies have found utility for such a brief screening of suicidality as done in this study (Bryan, 2011; Nademin et al., 2008), and the findings of the current study suggest that

screening military personnel and veterans for facets of IPT in addition to overt suicidal behavior may continue to be important. Further, for those service members or veterans who present in clinical settings and are assessed as having elevated suicide risk, the facets of IPT provide important areas to work on improving for the individual. Such assessment as conducted in this study would pinpoint areas in need of clinical work, such as facilitating belonging or decreasing feelings of being a burden. Alternatively, for those who score high ACSS and another IPT variable, education about the association between military training, acquired capability, and suicidal behavior may help the patient understand that his or her military training may serve as a liability when experiencing suicidal ideation. Finally, as indicated by the findings of significant interactions between IPT variables, addressing more than one of these areas is likely to have a better clinical effect on reducing suicidality than addressing only one.

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Table 1
Means, Standard Deviations, and Inter-correlations

	1	2	3	4
1. ACSS	1.00			
2. INQ-Perceived Burdensomeness	-.01	1.00		
3. INQ-Thwarted Belongingness	-.07*	.36**	1.00	
4. DSI-SS	.04	.38**	.23**	1.00
Mean	9.53	4.45	7.12	.03
Standard Deviation	3.28	1.78	4.38	.26

Note. ACSS = Acquired Capability for Suicide Scale; INQ = Interpersonal Needs Questionnaire; DSI-SS = Depressive Symptoms Index – Suicidality Subscale.

Table 2
Hierarchical Linear Regression Predicting DSI-SS scores from the interaction of INQ-TB, INQ-PB, and ACSS scores

	R^2	β	t	P
Step 1	.153			
INQ-PB		.049	11.869	<.001
INQ-TB		.006	3.807	<.001
ACSS		.004	1.976	.048
Step 2	.243			
INQ-PB		-.005	-.736	.462
INQ-TB		.008	4.674	<.001
ACSS		.004	2.231	.026
INQ-TB*INQ-PB		.007	10.036	<.001
ACSS*INQ-PB		.006	4.546	<.001
ACSS*INQ-TB		.001	3.10	.001
Step 3	.245			
INQ-PB		-.006	-.930	.353
INQ-TB		.008	4.673	<.001
ACSS		.003	1.685	.092
INQ-TB*INQ-PB		.007	10.209	<.001
ACSS*INQ-PB		.003	1.400	.162
ACSS*INQ-TB		.001	3.309	.001
ACSS*INQ-TB*INQ-PB		.000	1.832	.067

Note. ACSS = Acquired Capability for Suicide Scale; INQ = Interpersonal Needs Questionnaire; DSI-SS = Depressive Symptoms Index – Suicidality Subscale.

Figure 1
Hierarchical Linear Regression Predicting DSI-SS scores from the interaction of INQ-TB, INQ-PB, and ACSS scores